The Usage of Video Assistant Referee (VAR) and its impact on Players' and Fans' Emotional Experience of Football

---

Master of Commerce in Management

Department of Management, Marketing, and Entrepreneurship

Zin South

University of Canterbury

2022

Declaration of Authorship

"I hereby declare:”

That I have written this work on my own without other people's help. That I have mentioned all the sources used and quoted them correctly following academic quotation rules.

Date: 29.09.2022

Name: Zin South

Acknowledgements

Abstract

Video assistant referee (VAR) is comprised of three people who work together to review controversial decisions made by the on-pitch referee. VAR is used in four match-changing situations; penalties, red cards, goals, and mistaken identity (Chandler, 2021; FIFA, 2021). There are various gaps in past literature; notably, previous studies have not explicitly focused on the emotional impact VAR is having on both players and fans. This study addresses these gaps, conducting explorative research to collect qualitative data using interviews and Twitter sentiment analysis, to form the basis of this study. Primary semi-structured interviews are done with six professional players and six fans. Seven secondary interviews with professional players are also incorporated. This qualitative data is further analysed in terms of thematic analysis and sentiment analysis to help interpret and classify players' and fans' feelings and emotions resulting from VAR decisions in football. The findings illustrate that VAR is having more of an effect than its stated purpose of correcting 'clear and obvious errors'. Fans and players highlight that VAR creates consistent feelings of doubt and hope due to the suspense it creates during key moments in matches. They also felt that VAR is currently ambiguous, as well as disruptive to the time and flow of football matches. The Twitter sentiment analysis revealed that sentiment is more negative than positive but overall very neutral, which is reflected in the interviews. The findings of this paper can help those who want to contribute to the advancement of the application and functionality of VAR technology in football. This study aims to provide useful information and encourage researchers and governing bodies to further investigate the application of technology in football and the impact on stakeholders in order to promote the growth and advancement of football, as well as further the application of VAR across professional football leagues worldwide.

Table of Contents

List of Tables

List of Figures

Glossary

VAR – Video Assistant Referee

IFAB – International Football Association Board

MLS – Major League Soccer

KNVB – The Royal Netherlands Football Association

NFL – National Football League

NBA – National Basketball Association

FIFA – Federation Internationale de Football Association

GLT – Goal Line Technology

UEFA – Union of European Football Associations

1. Introduction

1.1 Introduction

This research will use qualitative primary and secondary data to investigate the debate around VAR and attempt to understand and determine the emotional impact it is having on football fans and players. Emotional impact can be defined as "the impact that something has on a situation, process, or person" (Sinclair, 2019). VAR is comprised of three people who work together to review controversial decisions made by the on-pitch referee. VAR is used in four match-changing situations; penalties, red cards, goals, and mistaken identity (Chandler, 2021; FIFA, 2021). VAR was originally part of an ambitious project by The Royal Netherlands Football Association (KNVB) to reinvent refereeing. The project initially began in 2012 with studies and trials on goal-line technology, which led to its successful introduction at the 2012 Football World Cup. The KNVB continued petitioning the International Football Association Board (IFAB) to introduce video assistance, and by 2015, following the election of FIFA president Gianni Infantino, there was finally a meeting held to discuss the KNVB's proposal for VAR (Medeiros, 2018). In previous years, football had experienced several infamous controversial moments related to refereeing, which was enough cause for concern in developing a solution to prevent these occurrences in the future. FIFA members took to the idea well, but more research had to be done at this stage. The KNVB had only conducted offline testing and trials in Netherland's top-flight league, the Eredivisie, in 2012/13. A two-year trialling experiment began in 2016 with international friendly matches, including Italy versus Germany and Italy versus Spain. The plan had initially been for VAR to examine a range of incidents involved with the game, but it was quickly realised that this was unrealistic and that only "clear and obvious errors" in match-changing situations would be addressed. By March 2016, VAR was approved by the IFAB (Asian Football Confederation, n.d.). The A-League in Australia was the first professional top-flight competition to employ the system, later used in Major League Soccer (MLS) and international level for the first time in the 2017 FIFA Confederations Cup. On 3 March 2018, the IFAB officially wrote the VAR into the Laws of the Game permanently (Samuel et al., 2020).

Emotion is a central feature of football. Passion, jubilation, excitement, anger, frustration, and despair are just a handful of emotions that can be attributed to football (Bairner, 2014; Biscaia et al., 2012; Jones et al., 2012). In 2016, during VAR's introduction process to the Premier League, David Elleray, a former premier league referee and now technical director of the IFAB said, "The time has come for the debate to be based on evidence... Everyone agreed that we needed to see if it works and whether or not it benefits the game... The initial testing will deliberately have a limited focus to minimise the impact of the flow and emotions which are crucial to football" (Elleray, 2020). Following a successful testing period during the 2018/19 season, VAR was introduced into the Premier League the following season. Despite this, it appears the "limited focus" on VAR's impact on emotions has remained, which leads to the background for the research.

1.2 Research Background

The technology's penetration into the football field has been accompanied by concerns and much criticism that, to a large degree, continues to be voiced with frequency. It can be said that VAR is "creating as much confusion as clarity" (Ogden, 2017). Some have argued that the implementation of VAR is ruining football as its pure form, that VAR is overstepping its boundary by eliminating nearly any human error which is a natural part of the game. This ultimately reduces uncertainty, and as a result, players and fans may be losing interest. It may be sucking the emotion out of football by disrupting the flow and atmosphere, stealing the raw emotion that players and fans yearn to experience. There is a very fine balance between trying to achieve maximal sporting justice and not destroying the instant emotional aspect that makes football so amazing (Ford, 2018). There have been few studies on VAR and fans, but none on players. Current research highlights various areas VAR is causing debate, including decision making in association football referees (Spitz et al., 2020), playing time, technical-tactical and physical performance (Errekagorri et al., 2020), offside calls (Mather, 2020b), fan perception (Kolbinger & Knopp, 2020; Mm & Nimkar, 2020), and general impact on the game (Han et al., 2020; Kubayi et al., 2021; Lago-Peñas et al., 2019; Orelli, 2020). VAR may be affecting fans and players emotions significantly, with some even forfeiting the celebration of goals in the moment. West Ham United striker Michail Antonio recently said, "I have had a couple of goals disallowed through VAR. I do not want to be there doing a dance, and then the goal gets disallowed. It would be embarrassing. VAR has killed it". (Antonio, 2021). Brighton Albion

forward Leandro Trossard also said he knows not to celebrate following goals because "we have not had luck with VAR decisions so far" (Trossard, 2019). Manchester City midfielder Kevin De Bruyne and Liverpool's Jordan Henderson shared similar views, with De Bruyne stating, "I do not know the rules any more honestly... Now there are a lot of rule changes... I do not know why" (De Bruyne, 2020). Henderson echoed this opinion saying, "I just want to play football as normal... We are talking about instances all the time and not the football. In my opinion, I would rather play without it, yeah" (Henderson, 2020). James Milner, a fellow Liverpool player, took to Twitter to argue, "It's "clear and obvious" we need a serious discussion about VAR... I'm sure, I am not alone in feeling like they are falling out of love with the game in its current state" (Milner, 2020). These comments were backed up by another Liverpool teammate Andrew Robertson, who concurred that it is affecting players and the game: "I used to love going to games and just being in that moment of being able to celebrate a goal... Milner's tweet was echoing what a lot of footballers and fans are feeling... A lot of people I have spoken to are not enjoying football as much as they once did because it is constantly in review" (Robertson, 2020). In response to these many expressions by players and fans' relentless debate on VAR since its introduction, in 2021, FIFA finally said that they understand the benefits of allowing fans into the process behind VAR decisions but believe that further analysis is required (Jackson, 2021).

1.3 Research Rationale

1.3.1 Gap

Despite previous studies, no research has been done on the emotional aspect of VAR. Various studies called for additional research into the impacts VAR is having on elite football (Hasmund & Scelles, 2021; Orelli, 2020; Winand et al., 2021). The closest related studies have focused specifically on fans' perception of VAR, not the emotional response for players and fans.

1.3.2 Research Aim Objectives and Question

The aim of this study is to address if the implementation of VAR is having an impact on football players' and fans' emotions and provide insight into the preference of absolute accuracy and justice, or the raw emotional experience of the beautiful game, with all its rights and wrongs.

The following two objectives were designed to guide this study:

(i)   This research will use semi-structured interviews with football fans and professional players to attempt to explore if VAR affects their emotional experience.

(ii)   To use Twitter sentiment analysis to explore the sentiment of tweets and understand if there are any themes with the semi-structured interviews.

The research question attempts to explore how VAR impacts player and fan emotions in football and what impact this has on their experience of football. The discussion section will aim to analyse the subsequent findings and provide an answer to this research question.

1.4 Research Methodology

This research is concerned with the emotional impact of VAR on players and fans. This is a sports management research topic that focuses on the scope of sport for development from a human perspective, taking the angle from players and fans towards the application of VAR in football. This can be extended towards sports marketing as the aim is to have more people playing and watching football. The following literature review provides a strong base for qualitative research. As a result of this, explorative research will be conducted to collect qualitative data, which will form the basis of this study. In-depth, semi-structured interviews were selected as the most appropriate primary research for collecting data. Secondary research will also be used to support the study, consisting of player interviews and fan interviews, as well as Twitter data, and other forms of web content. A total of twelve primary interviews will be conducted, six with players and six with fans which fit the selection criteria. Following this, data will be collated and analysed using content analysis.

A key aspect of sample size is the 'depth' of data as opposed to the numbers; hence, participants should adequately represent the topic (O'Reilly & Parker, 2012). For research in this vein, Creswell et al. (2007) suggest between 5-25 and semi-structured/in-depth interviews. Based on this, 12 primary interviews were selected due to the depth of knowledge they aim to cover and to reach "saturation" in the data. Glaser and Strauss (1967) define saturation as when "no additional data are being found whereby the researcher can develop properties of the category."

This study will be conducted with a critical realist perspective, acknowledging that participants' experiences are considered real for the individual, whilst the collected data will be subject to participant's and researcher's perceptions of the cultural, social, and historical context in which they occurred.

1.5 Outline

This research project consists of several chapters. The introduction introduced the research by providing a background for the chosen subject area, the aims and objectives of the research, introducing the concepts to be studied, and determining the implications of the research. This section helps provide background to the study and illustrate the gap in the literature. Chapter two contains a literature review that will provide depth to relevant concepts of the study, including technology in sport, sport and entertainment, technology and its impact on sports fans, emotion in football, referee decision making and bias, as well as the New Zealand context. The methodology in chapter three outlines the methods adopted for the research and how it was carried out. Section four objectively and neutrally present the findings gathered from the semi-structured interviews and Twitter sentiment analysis. Chapter five contains the discussion and conclusion section where the research gap, aim and objectives will be revisited. The findings that were obtained will be interpreted and understood based on the research question. Following that, practical and theoretical contributions will be addressed as well as limitations. Lastly, recommendations towards future research will be suggested before a conclusion, including a brief summary of the full study.

2. Literature Review

2.1 Introduction

This narrative literature review identifies relevant literature regarding the use of video assistant referees and its impact on emotions within football. Caution always must be applied when implementing new technology in any situation. In professional sport, this is largely due to the impact it may have on managers, employees, fans, and players. Professional football is a form

of entertainment where viewership, attendance, and merchandise sales play an important role in the progress of the game; therefore, fan and player satisfaction should be a top priority when considering the use of technology like video assistant referees (VAR). The interaction of football and technology has had a mixed reaction amongst the supporters of the sport around the world; some view it as a necessary burden to the sport, while some argue it takes the energy out of the sport (Mm & Nimkar, 2020). To support this, the literature review will look at the relationship between sports and entertainment and the impact on viewership and fan perception due to technology implementation. Literature on the history of technology in sport, specifically football, will also be studied, as well as refereeing decision making and bias. VAR is the latest big change to football and has caused a lot of controversy since its introduction in 2016. Through this literature review, further understanding and perspective can be gained across a variety of topics. There has been a range of studies on the effect VAR has had on the game itself (Ezurmendia Álvarez & Valenzuela Saldías, 2021; Spitz et al., 2020; Tamir & Bar-eli, 2021), but little research has been undertaken into the emotional impact it is having on fans and players in football. This literature review will use books, journals, articles, theses, websites, and reports across a variety of disciplines to obtain key literature surrounding various topics.

2.2 Technology in Sport

In terms of VAR in football, it was first tested in 2012 by the Eredivisie. In 2016 it was then introduced in a friendly between France and Italy, with this successful trial leading to a pitch side monitor in the FIFA Club World Cup (Hire Intelligence, n.d.). In 2017 the A-League in Australia became the first professional league to use VAR, which was followed soon after by the MLS, Serie A, and Bundesliga. In 2018 VAR was used in the FIFA World Cup and in England for the first time in an FA cup game. The Spanish La Liga also introduced it for the 2018-19 season. In 2019 the Premier league featured VAR for the first time after clubs voted unanimously to introduce the system (Premier League, 2020).

The concept of technology is very broad and has been analysed by various philosophers. Heidegger (1977), a German philosopher, argued that technology is both a 'means to an end' and a 'human activity' (Heidegger, 1977). This view suggests that technology is something humans use to achieve specific goals. Heidegger's theories on technology have been

encouraged by researchers such as Hilvoorde and Vos (2007), who had a similar view that technology aims to take away needless obstacles and inefficiencies through a process of justification. Technology is supposed to make life easier and more comfortable, which is generally not the goal in sport (Hilvoorde & Vos, 2007). Loland (2003) claimed that the view of technology as a 'humanmade means to reach human interests and goals' is the definition used most frequently within writings on technology in sport (Loland, 2003). Ihde and Zorn (1994), however, view technology as an "*intentional understanding-relation* with things," treating it as a monolithic force (Ihde & Zorn, 1994). There is a theme among researchers' views that technology in sport acts as a means of achieving goals that otherwise could not be achieved.

Gulhane (2014) looked at various types of advanced technologies in sports. Gulhane's paper took the position of looking at technology in a performance advancing way, which focuses on the athlete within the sport, not the sport itself. The paper discussed various benefits to sporting technologies yet failed to mention any disadvantages. High-speed cameras, computer-aided design, and hawkeye are the main technologies examined in the article in terms of how they enable better match analysis, performance ranking, player selection, sports statistics and predictions, and, in general, make the sport more interesting (Gulhane, 2014). Hawkeye, a common piece of technology used in professional football, is mentioned as beneficial technology that provides a multitude of information during cricket and tennis matches (Gulhane, 2014). Although this is a published article in the Journal of Sport and Physical Education, it lacked detail and had minimal reference to any previous literature. Omoregie (2016) wrote a similar article on technology in sport and its impact on performance. He acknowledges that the "use of technologies is without exception, tainted with frustration and ambivalence" (Omoregie, 2016). The article considers the theories of technology, advantages, disadvantages, and the quest for improved performance. It examined three views of technology: substantive, determinist and instrumentalist. Omoregie stated that the instrumental theory offers the most widely accepted view of technology but refers to Heidegger's popular theory of technology within the substantial approach (Omoregie, 2016). Omoregie discussed a range of sports technologies, including self, landscape, implement, rehabilitative, movement, and database. Unlike the article by Gulhane (2014), Omoregie's work shows just how broad the scope of technology in sport is and provides a thorough insight into each technology. Omoregie summarises sports technology by suggesting it "is man-made means created to reach human interests or goals in or relating to a specific sport. It is the knowledge and application of using

specialised equipment to perform tasks more efficiently" (Omoregie, 2016), demonstrating a view consistent with Loland (2003).

Sidhu (2011) looked at technology in sports from a statistical analysis perspective, using Bayesian Inference and Markov Chains Monte Carlo methods. Unlike previous research, Sidhu focused on how statistical analysis can be improved and found that with help from AI, it is possible to improve results. "This is best illustrated when evaluating football using Neuro Dynamic Programming, a control theory paradigm heavily based on theory in Stochastic processes. The results from this method suggest that statistical analysis in sports may benefit from using ideas from control theory or machine learning" (Sidhu, 2011). Dyer (2015) conducted a systematic review, which looked specifically at the controversy of these technologies; he discussed how they affect the nature of the sport and athlete's performance. This study identified 56 articles and 31 different case studies over a three-decade time period. Thematic analysis revealed distinctive themes, such as "deskilling" and "reskilling" when reviewing the articles (Dyer, 2015). A prominent theme throughout this literature is the application of sporting technology and how it can improve performance within it, but in doing so, lead to "deskilling" among participants.

2.3 Sport and Entertainment

The sport continues to grow every year as a form of entertainment and a money-making scheme for many businesses. A lot of sports consumption and attraction can be attributed to the media, as well as fans' and followers' unquenchable thirst for sports in any shape or form.

Gratton and Solberg (2007) look at the economics of sport and broadcasting. They found that from 1983-1985, English football was broadcast by the BBC and ITV for £2.6 million. This increased drastically when Sky bid for 60 premier league games in 1992 at the cost of £38 million per year. This then increased significantly during 2001-2007 when Sky paid £2.2 billion for a high portion of games. Since then, Sky and BT joined in a deal to broadcast live premier league games from 2016 to the 2018/19 season for a combined £5.3 billion (Chaudhary 2016, as cited in Hunt, 2017). Gratton and Solberg (2007) observed that unprofitable deals are often caused due to the distribution of revenue and cost, not due to the gap between total revenue and costs. They also find that product demand is correlated with the uncertainty of outcome.

Therefore, people are more interested and invested in sport with less predictability. These researchers ignored the importance of sports culture, where celebrity athletes drive the demand in sports marketing. This article was also written more than ten years ago; therefore, the emergence of new technologies was not considered. Lundberg's book (2007) on entrepreneurship and the experience economy looked at the case of kitsch in the experience economy, focusing on sports as entertainment. Lundberg conducted a grand narrative analysis on sport as entertainment, describing it as a proto-industry of the experience economy. Section one of Lundberg's book presented the concept of 'sports as entertainment'; section two presented the central role of mass media in relation to sport; section three analyzed the concepts of 'aura' and 'nostalgia.' Section four took more of a cultural perspective which Gratton and Solberg (2007) failed to do, focusing on the role of escalating aura production found in nostalgic storytelling in the world of sports, using the examples of athletes Henrik Larsson and David Beckham.

Coakley (1994) covered a range of research on issues and controversies of sport in society. Coakley emphasized how media and sport grow together and support each other and argued that without this relationship, the professional sport would not be so popular due to less emphasis on events such as the Football World Cup. Coakley (1994) also looked at the factors involved in deciding to play sport, three of which were: social and material support, memories of past experiences in sports, and general cultural images and messages about sports (Coakley, 1994). The research found that burnout among elite young athletes was most likely when: high-performance sports were organised in a way that athletes had minimal control over their lives, and sport was interfering with accomplishing important developmental tasks (Coakley, 1994).

2.4 Technology and Its Impact on Sport Fans

Studies specially focused on the impact technology is having on players' and fans' emotions within sports are a rarity, as most studies, reports, and media articles look at the perspective of the effect on the game itself or referees. There have been a few studies, however, which examined fan perception of VAR and other technologies.

Mm and Nimkar (2020) studied the perception fans had regarding various technologies used in the world of football on and off the field. This was done by means of a questionnaire answered by 160 participants who had a basic knowledge of the various technologies being used in football (Mm & Nimkar, 2020). The paper focused on major refereeing decisions and how technology could have changed the outcome of these events. The study also included discussed the development of e-sports, which describes the world of competitive, organized video gaming, and how this has been important in popularising football. This is something that has not been included in other literature and is important to include when looking at football and technology as a whole. Both the pros and cons of goal-line technology and VAR were discussed, as well as how technology had been important in improving fan engagement through social media. Results showed that 88% of participants were in favour of the opinion that e-sports games like FIFA had been vital in popularizing the sport and increasing viewer's knowledge. Notable results also showed that 66% of participants were in favour of implementing a decision-based review (DRS) system into football whereby the captain can challenge one referee's decision per game. Overall the main findings of this study indicated that both the human element and technology should go together for the improvement of the game (Mm & Nimkar, 2020).

Winand and Fergusson (2016) conducted a study that aimed to investigate Scottish football supporters' perceptions towards goal-line technology (GLT). 277 supporters were asked to complete a questionnaire based on their satisfaction with GLT. The results showed that "the majority of Scottish supporters trust the technology applied in football and favour its use" (Winand & Fergusson, 2016). They did believe, however, that GLT is considered to detract from the atmosphere resulting from controversial goals, which supporters appreciate and lessen the debate around crucial decisions. Further findings showed supporters were not in favour of GLT viewing from inside the stadium and did not encourage any further decision aid technology within football. Goal-line technology has been proven since its introduction in 2011, with there being no grey area around it compared to VAR due to the nature of a clear decision regarding the ball crossing the goal line or not.

Fletcher and Stoney (2020) produced a study focused particularly on decision-aid technology use and its impact on event experience in rugby union. Similar to (Mm & Nimkar, 2020; Winand & Fergusson, 2016), this study also used a qualitative methodology with a questionnaire being the main method. This questionnaire was aimed at rugby fans globally.

Seven semi-structured interviews were also conducted "with governing body representatives from most of the major competitions around the world, television match officials (TMO) and a television producer from a broadcaster's rugby union unit" (Fletcher & Stoney, 2020). Following analysis of 194 questionnaire responses and 11 interviews, three broad topics were revealed: 1) fan identity and understanding of rugby; 2) demand for audio; and 3) use of images. Findings showed an inconsistency in how TMO decisions are relayed to match crowds, which as a result, affects fans' experience. Findings also showed fans were generally in favour of TMO use but wanted better information on the decisions. These findings were consistent with Hamilton's football research, wherein it was argued that fans need access to better information on VAR decisions (Hamilton, 2019). Surprisingly, Fletcher and Stoney's findings oppose those of Winand & Fergusson, where they found that supporters were not in favour of GLT viewing from within the stadium. This could be due to various reasons, such as the difference between the decision-aid technology across sports and the difference between fan preferences in rugby and football. These studies showed a consistent theme that fans and players demand better information on VAR and TMO decisions. Considering VAR and TMO decisions are usually down to interpretation, there is no surprise that there is a demand for more information regarding the decisions. FIFA may be aware of this, stating in 2021 that they can see the benefits of allowing supporters into the process behind VAR decisions but believe that further analysis is required (Jackson, 2021).

Roger-Monzó (2015) studied the evolution of sports broadcasting from television through new technology. This study was different from other studies in that it aimed to describe how technological innovations have influenced the conduct and narrative structure of televised football. It helped show what effect the growth of technology is having on fans' viewing experiences. This was done through a literature review used to distinguish four stages in carrying out broadcasts in football. Roger-Monzó (2015) concluded that the introduction of new technologies had influenced the conduct and narrative structure of football broadcasting, stating that "today, top-level sport is inconceivable without television" (Roger-Monzó, 2015). This is down to the fact that the style of earlier broadcasts was purely informative, as the only aim was to show what was happening on the football field, ignoring the stands, the multiplication of the possible points of view. The new production strategy of broadcasters aims to merge the informative spirit with a conception of the sporting event as an audiovisual spectacle (Roger-Monzó, 2015) (translated from Spanish).

2.5 Football's Emotional Impact

Izard (2010) attempted to define "emotion" with support from leading emotion scientists and responses by other experts. In this study, four sets of data were obtained all revolving around scientist's findings on the definition, activation, and functions of emotion. The results supported the view that the term "emotion" is "ambiguous and has no status in science" (Izard, 2010). Dixon's study (2012) compared intellectual and semantic history of "emotion" to contemporary debates about the usefulness and meaning of "emotion" as a scientific term. The results of Dixon, as well as Izard, point to the fact that emotion has many meanings. Izard does, however, state that "emotion consists of neural circuits, response systems, and a feeling state/process that motivates and organizes cognition and action" (Izard, 2010). Studies on football's emotional impact predominantly used qualitative research methods consisting of questionnaires, structured interviews, and models. Previous literature examined the emotions involved with football and the psychological factors involved in fans experiences.

There is a general theme among these studies that shows positive emotions have a positive influence on behavioural intentions. Biscaia et al. (2012) conducted a study that examined the relationship between spectators' emotions, satisfaction, and behavioural intentions at football games. This consisted of a survey among spectators of the Portuguese Super Liga and used a structural equation model to gather results. This model included 22 emotions, with the items scoring the highest being selected for further analysis. These emotions included 'anxiety,' 'dejection,' 'anger,' and 'joy'; however, passion, a common emotion throughout other literature, was not included. The findings showed that only the emotion of joy had a positive direct effect on satisfaction, and an indirect effect on behavioural intentions via satisfaction. In turn, dejection had a negative direct effect on behavioural intentions, and satisfaction positively influenced behavioural intentions. Building on this, a study by Bairner (2014) is the sole study that sheds light on the ways in which football grounds are sites of acts of intimate emotional remembering that can exert a powerful hold over individuals based on the stories and memories that they create (Bairner, 2014). Barnier used the stories told in this paper to demonstrate the sociological significance of emotion, memory, and place. He also adopted a narrative approach to integrating his own memories and moments. Barnier concluded that the stories told "represent an invocation of emotions that are now indelibly associated with specific football grounds at particular times" (Bairner, 2014).

Whitbourne (2018) wrote on the two types of emotions that drive sports fans and research that shows the importance of passion to the experience of sports fans. This looked at various studies, including those done by Vallerand et al. (2008) who conducted three studies in order to determine that passion is the central element of fans' emotional experiences. A dualistic model of passion was used in these studies, distinguishing between two types of passion, "obsessional passion" and "harmonious passion." These studies found that the passion associated with football "serves to define the person" (p. 1280), and "cheering for a football team indirectly entails cheering for self" (p. 1280) (Vallerand et al., 2008). Findings from the first study indicated that harmonious passion was positively associated with adaptive behaviours and obsessive passion was positively associated with maladaptive behaviours. Using a passion scale, study two showed that harmonious passion was positively related to fans of 2006 FIFA World Cup. Psychological health, public displays of adaptive behaviours, and obsessive passion were predictive of maladaptive affective life and behaviours (Vallerand et al., 2008).

Adding to this, Jones et al. (2012) conducted a similar study which showed results consistent with those of Vallerand et al. (2008). The study looked at resulting changes in social interaction and spending by English and Spanish fans in response to team success during the 2010 Football World Cup. This study used a between-group and within-group longitudinal design to collect data on emotion, team identification, social interaction, and spending. "This included 59 English fans (47 men, 12 women), and 32 Spanish fans (19 men, 13 women), before, during and after the 2010 Soccer World Cup" (Jones et al., 2012). Results showed that both Spanish and English fans showed obvious changes in emotional state after the success or failure of their national teams during the Football World Cup. Spanish fans' positive emotional state following winning the tournament lasted for over four days, whilst the negative emotional state of England being knocked out early on in the tournament did not. Spanish fans were also reported to have spent more time socialising and spent more money on average than usual. "This data provides evidence that group membership influences emotion and that positive emotions related to group success last longer than negative emotions related to group failure" (Jones et al., 2012).

2.6 Emotional Experience

In a 2014 paper, Nogueira (2014) highlights the concept of emotional experience or lived experience, as established by Lev Vygotsky, who refers to it as perezhivanie. This concept explains how each person may experience and develop a different attitude in the same situation (Nogueira, 2014). Nogueira (2014) states that emotional experience "is a unit in a constant dialectic relationship between the representation of the outside world and how the world is experienced by the person." This essentially means that emotional experience is how somebody comprehends something that has an impact on them: "Each event in a situation has a different effect on behaviour depending on how each person understands it" (Esteban-Guitart and Moll, 2014). Vygotsky described emotional experience as a tension between the given world and the way people experience it. Nogueira (2014) interprets Vygotsky's emotional experience as "the result of what impacts the person and how these situations are comprehended and signified by the person" (Nogueira, 2014). Nogueira (2014) also quotes Smolka (2016) who states the experience is always meaningful.

Thonhauser and Wetzels (2019) incorporated the concept of emotional experience into their paper on emotional sharing in football audiences. They aimed to identify shortcomings in received theories and present an alternate solution for understanding audience emotional dynamics. They proposed an emotional sharing concept for investigating emotional social-relational interactions and offered a working definition of audience as a social collective that is both dynamic and distributed. Thonhauser and Wetzels (2019) referenced a concept by Durkheim (1968) whilst describing the emotional intensity at football matches as 'collective effervescence' (CE) which refers to a community or society coming together and simultaneously communicating the same thought and participating in the same action (Durkheim, 1968). Thonhauser and Wetzels (2019) question if this is what actually occurs in a stadium and explain how this reliance on crowd semantics dates back to the beginnings of sociology and how it is still present in modern social ontology. They describe two circumstances they think are required for emotional sharing to be possible, diachronic and synchronic integration (Krueger 2016; Thonhauser 2018b). Thonhauser and Wetzels (2019) believe that it is important to investigate how members of a stadium crowd affectively resonate with one another, the athletes on the field, and the setting in real-life situations, and how this shapes their emotional experiences.

A relevant paper by Tamminen et al. (2014) discussed emotional experiences and coping in sport. This paper examined how adaptation is defined in the sport psychology literature, as well as related concepts such as mental toughness. Secondly the importance of emotions in athletes' adaptability was discussed, including how emotions arise and how they affect athletic performance. Tamminen et al. (2014) use the example of a baseball player's joy after hitting a game winning home run and how it can only be understood based on the meaning of that game to the athlete. Based on this same concept, Smith and Lazarus (1991) propose that the majority of emotional experiences are meaning centred. Tamminen et al. (2014) also discussed coping in the form of expressions like crying and yelling that results from emotional experiences.

2.7 Referee Decision Making and Bias

According to Paasch (2019), referee decisions are based on four steps: 1) perception of a situation; 2) assessing a situation and establishing a fact; 3) decision and application of rules; 4) rule implementation. Various processes can influence these decisions. There is scientific evidence that biases influence a range of arbitrators. Examples of these include home crowd's noise, players' reputations, a team's origin, and own prior decision (Gottschalk et al., 2020). The video assistant referee was introduced to improve football by correcting clear and obvious errors in match-changing situations.

Referee decision-making and bias have long been a popular topic of interest, with a range of studies having been done, each producing similar results. Boyko et al. (2007) produced one of the earliest referee bias studies that used an ordinal regression model and "examined 5244 English Premier League (EPL) match results involving 50 referees" and found that home bias differed between referees (Boyko et al., 2007). The findings showed that referees varied in their yellow card and penalty differentials and that "individual referees give significantly different levels of home advantage, measured as goal differential between the home and away teams" (Boyko et al., 2007). This study failed to take into account any variable such as crowd noise. However, it was suggested that further research be done in terms of referees' psychological and behavioural responses to biased crowds. In addition to this study, Lago-Peñas and Gómez-López (2016) conducted a study aimed to discover if referees tended to

favour "big" teams by shortening games with the bigger team leading and extending close games with the bigger team behind. To do this, they used a sample of 380 matches in the Spanish La Liga over the 2014-2015 season. The dependent variable was the extra time the referee added, and the independent variables were the score difference, the opponent team's level of play, yellow cards, red cards, player substitutions, average attendance, and fouls committed (Lago-Peñas & Gómez-López, 2016). A linear analysis showed that the higher the score margin between the teams, the less extra time applied by the referee. In closer matches, the referees tended to add a greater amount of extra time when a higher-level team was behind and less time when they were winning.

Albanese et al. (2020) claimed they were the first study to investigate if the introduction of additional assistant referees in the UEFA Europa league 2009-2010 season and EUFA Champions League 2010-2011 season was associated with lower referee bias for "big" teams. The limitation of this was the lack of previous research they were able to draw on. They used bivariate probate regression models to analyze a database containing characteristics of all games in the previous seven seasons. Significant evidence for referee bias was found prior to the introduction of the additional referees, while no such evidence was found after (Albanese et al., 2020). Findings also included multiple factors such as yellow cards and extra time to avoid any question of general time evolution towards less referee bias. Erikstad and Johansen (2020) provided further research by examining whether Norwegian Premier League (NPL) referees are biased by a team's success when awarding penalties. To do this, they used video footage alongside an expert panel of four NPL referees who were asked to evaluate 43 potential penalty situations where two successful NPL teams were in question. Fifty-five potential penalty situations from matches without successful teams were also rated (Erikstad & Johansen, 2020). The results showed that of the 43 potential penalty situations involving the successful teams, the match referee awarded 11 penalties to the successful teams. The expert panel's assessment of the same situations showed successful teams should have been awarded 10 penalties and that their opponents should have been awarded eight penalties (Erikstad & Johansen, 2020). This indicated that the referee's decisions might be unintentionally biased by a team's success. Some aspects of this study were consistent with Boyoko et al., who found that individual referees tended to favour teams playing at home. In particular, the finding that "unsuccessful" teams were only awarded one penalty playing at home when the expert panel deemed they should have been awarded eight. Based on this, there is a point to be made that research needs to be done on potential favouritism for "successful" teams playing at home.

The previous literature on referee decision making and bias mostly consisted of quantitative research methods, in particular regression analysis, which is a reliable and suitable method as it has been used to identify which variables have an impact on referee bias. There has been a significant amount of literature that shared a common theme of referee bias towards "successful," "big," and home teams across various football competitions, including the English Premier League, Spanish La Liga, Norwegian Premier League UEFA Europa, and Champions League.

2.8 New Zealand Context

There were very few sport-related studies in the context of New Zealand literature, especially associated with technology and football. According to the School Sports New Zealand Census 2020, football is the fourth most played sport within schools with 20,700 participants (NZSSSC, 2020). It is growing, however, with New Zealand Football (NZF's) strategic plan targeting 102,000 males and 33,000 females participating by 2025 (New Zealand Football, 2020). New Zealand's only professional club is the Wellington Phoenix, who compete in the Australian A-League; other than this, there has been a new semi-professional "National League" confirmed in 2021 that will feature 30 teams competing in the men's competition across three regional leagues attempting to qualify for the National League Championship. The women's competition will feature the four best club sides from the northern region, along with four federation sides from the rest of the country (NZF, 2021). Decision review technology such as VAR and hawkeye goal-line technology has never been used in an NZF competition, and no confirmation of this has been made regarding the National League Championship.

Alder (2015) looked at meaning and sense making in high-performance sport, which involved following culture and change in a high-performance sport within a New Zealand context. The focus of this study was the HBU at New Zealand Rugby League (NZRL). Alder used a theoretical framework with an ethnographic action research methodology to examine the experience of living through change and provide a deep, contextual narrative of a change effort with a national sports team (Alder, 2015). Findings showed the importance of personal and shared experience as well as identity in meaning construction and change. The study seeks to

inform management practice by promoting the role of meaning and sense making in high-performance sport (Alder, 2015).

2.9 Conclusion

By reviewing and critically analysing five subtopics of the theoretical foundation, a variety of relevant studies from each area of the topic in question were able to be identified. The literature review looked at technology and its ever-changing role within sports as well as sport as a form of entertainment and how technology is impacting this. The review then examined the fan perception of technology in sport and the emotional impact football can have as a whole. Finally, the review looked at previous literature on referee decision-making and bias. These five subtopics are all relevant areas that make up the main basis of the review. The disciplines were generally sport-focused, derived from sports journals; management, economic, and philosophical studies were also included. The literature was generally unbiased, contained extensive research on previous literature, and was published across credible journals, websites, and books. Consistent results were produced across similar studies that all included a large sample size. Following the literature review, it is clear that the state of research on the usage of VAR and its impact on players' and fans' raw emotions in football has so far not been sufficient to provide a meaningful overview. There is an especially significant gap in the literature of professional players' perception of the usage of VAR and how it impacts how they feel about the game they play for a living. There is a small number of studies on fans' association with VAR, but they do not focus on how it impacts their emotional experience of football. This review of previous literature suggests that the New Zealand Football Association, as well as other governing bodies, require further research before making management decisions deciding upon the use or refinement of VAR in their respective leagues.

3. Methodology

3.1 Introduction

This study utilises primary research based on interviews done by convenience sampling with six football fans and six football players to develop an in-depth understanding through

narrative. Secondary data was collected based on Twitter data, interviews, and other formats of web content. This qualitative data was then further analysed in terms of content analysis and thematic analysis to help interpret and classify players' and fans' thoughts and emotions resulting from VAR decisions in football. Information on VAR decisions, fan viewership, and attendance is also used to support the study. This section aims to identify the methods used in this study. This section will describe why each research method has been chosen and how it will produce the best results. The study uses primary as well as secondary data to collect the relevant information to complete the study. Primary and secondary data will help provide different perspectives and the secondary data will be important to back up the primary data. The study uses qualitative data, collecting and analysing personal accounts through non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences.

The primary method used to gather data was a semi-structured interview with professional players and fans. Semi-structured interviews were used to collect in-depth personal accounts that provided rich, detailed responses. Secondary data was retrieved from post-match interviews, articles and websites. This secondary data was organised into tables before being analysed using thematic analysis. The secondary data helped add to the primary data and provide a greater depth of information for the study.

3.2 Research Philosophy

A research philosophy offers a framework on how the research should be gathered based on beliefs and ideas about reality and the nature of knowledge (Collis & Hussey, 2014). Burrell and Morgan (1979) introduced the idea of four paradigms to make sense of research. On the horizontal axis, there is an objective and subjective side. On the objective side, researchers see the world as an objective world waiting to be discovered. On the subjective side, researchers see reality as something that is in people's minds. As for the vertical axis, there is radical change and regulation. Researchers that lean towards regulation see the world as a stable place while those that lean towards the radical change end see the world as a place that should be changed to create more equal social arrangements. Figure 1 demonstrates the above. Refer to Burrell and Morgan (1979) for the original iteration of this.

Figure 1

The Four Paradigms
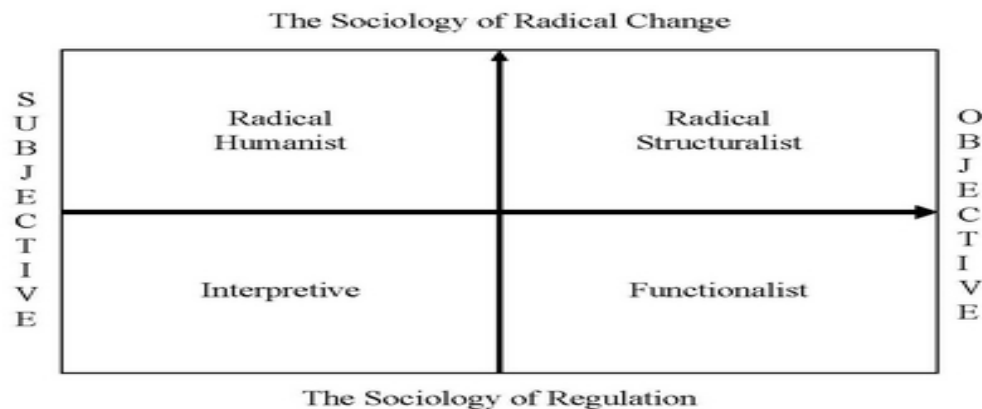
Two of the most common research philosophies are positivism and interpretivism (social constructivism). Saunders et al. (2016) provided a research onion model in their book titled Research Methods for Business Students that identifies relevant research philosophies. Positivism and interpretivism are located at the top end of the spectrum and radical structuralism is at the bottom end.

3.2.1 Positivism

Positivism evolved from the philosophical ideas of the French philosopher Auguste Comte. Comte's ideas originated from the social and intellectual movement that tried to learn from the mistakes of the eighteenth-century Enlightenment that eventuated in the Reign of Terror after the French Revolution. During the early 1800s, various sciences had developed at different rates, with sociology emerging last. As each science developed, it underwent three stages – theological, metaphysical, and eventually, positivistic. By the early 1800s, the idea that sociology and other social sciences could take their place at the table of science was widespread, but it was Comte who forged the various lines of argument into a forceful advocacy for a science of society in the 1830s. Comte's preferred name for sociology was *social physics*, and this name demonstrates his desire to develop a sociology organised around basic laws of the social universe (Turner, 2001). Comte argued for sociology where abstract laws would explain the dynamics of the social universe. Comte believed that no real observation of any kind of phenomena was possible, except in as far as it was first directed, and finally, interpreted, by some theory (Martineau & Comte, 2009). Comte proposed four methods to collect data in order to explain and assess the workings of the social universe: observation, experimentation,

comparison, and historical analysis (Turner, 2001). A positivist view with an ontological perspective (naïve realism) approach assumes that a single objective reality exists independently of what individuals perceive. Guba & Lincoln (1994) describe this as an apprehendable reality that is assumed to exist, shaped over time by means of social, political, cultural, economic, ethnic, and gender factors that have been refined into structures that are now believed to be "real," that is, natural and immutable. This is driven by immutable natural laws and mechanisms. Knowledge of "the way things are" is conventionally summarised in the form of time- and context-free generalizations, some of which take the form of cause-effect laws. At the ontological level, positivists assume that reality is objectively given and is measurable using properties which are independent of the researcher and instruments; in other words, knowledge is objective and quantifiable (Henning, Van Rensburg and Smit as cited in Stephen Kwadwo Antwi, Kasim Hamza, 2015). This can be interpreted as meaning that whatever exists can be verified through experiments, observation, and mathematical/logical proof; everything else is non-existent. In addition, positivists usually believe that scientific progress will eradicate, or at least sharply reduce, the problems facing mankind (Trochim, 2006).

3.2.2 Radical Structuralism

Burrell and Morgan (1979) define radical structuralism as "committed to radical change, emancipation, and potentiality, in an analysis which emphasizes structural conflict, modes of domination, contradiction and deprivation". The radical structuralism paradigm is based on a materialist understanding of the natural and social world, so it assumes that reality is objective and concrete. Like the natural world, the social world also has an independent existence, existing outside of human minds. The radical structuralist viewpoint combines objectivity and transformation (Burrell & Morgan, 1979). According to radical structuralists, conflict is a natural part of society and it is these conflicts that lead to social change. They frequently have an interest in deprivation, structural conflict, and inconsistencies (Taylor & Callahan, 2005).

3.2.3 Interpretivism/Social Constructivism

This thesis study is underpinned by the interpretivist (social constructivist) research philosophy. Interpretivism emerged as a result of the perceived inadequacy of positivism to meet the needs of social scientists (Collis and Hussey, 2014, p.44). The position of interpretivism in relation to

ontology and epistemology is that interpretivists believe the reality is multiple and relative (Edirisingha, 2012). It takes the view that "knowledge in some area is the product of our social practices and institutions, or of the interactions and negotiations between relevant social groups" (Des et al., 2004). Social constructionism contends that knowledge is sustained by social processes and that knowledge and social action go together. It is less interested, or not at all interested, in the cognitive processes that accompany knowledge (Young & Collin, 2004). This is effectively an idea that knowledge is constructed through interaction with others. As an epistemology, social constructionism asserts that knowledge is historically and culturally specific; that language constitutes rather than reflects reality, and is both a pre-condition for thought and a form of social action; that the focus of enquiry should be on interaction, processes, and social practices. Corollaries of the social construction of knowledge are indeterminacy, polyvocality, the need for contextualisation, and "pragmatics" (Young & Collin, 2004). Importantly, social constructionism does more than say that something is socially constructed: it points to the historical and cultural location of that construction. Interpretivists contend that only through the subjective interpretation of and intervention in reality can that reality be fully understood. The study of phenomena in their natural environment is key to the interpretivist philosophy, together with the acknowledgement that scientists cannot avoid affecting those phenomena they study. They admit that there may be many interpretations of reality, but maintain that these interpretations are in themselves a part of the scientific knowledge they are pursuing. Interpretivism has a tradition that is no less glorious than that of positivism, nor is it shorter.

3.2.4 Ontology

The definition of ontology is the nature of reality (Hudson & Ozanne, 1988). This refers to the study of being. Everything one can think of can also be said to 'be' something in some way. Finding the fundamental nature of existence of a specific phenomenon is the goal of ontology. We refer to a specific kind of knowledge that exists outside of the researcher when we look for answers (reality) to our research questions. Ontology is a system of belief that reflects an interpretation of an individual about what constitutes a fact. Ontology is a system of belief that reflects an interpretation of an individual about what constitutes a fact. In simple terms, ontology is associated with what we consider as reality. For example, animals, ideas, feelings and roles all have some, or participate in, being (Al-Amoudi & O'Mahoney, 2015). The existential conditions pertaining to the material, social, cultural, and political environments are

the focus of ontology. As a result, it becomes crucial to consider the relationship between epistemology and ontology. In other words, relationships between facts and values as well as relationships between knowledge and the culture in which it is produced have grown to be crucial issues. (Ejnavarzala, 2019)

3.2.5 Epistemology

The SAGE Online Dictionary of Social Research Methods defines epistemology as: a field of philosophy concerned with the possibility, nature, sources and limits of human knowledge (Sumner, 2006). Contrary to ontology, epistemology deals with the methods used to acquire knowledge (that is external to the researcher) and understand reality. Therefore, it is concerned with issues like "how do we know what is true?" and "how do we tell what is true from what is false?". Epistemology is therefore a personal matter for the researcher. It is how they interpret their surroundings (Edirisingha, 2012). Epistemology is what we perceive and describe reality to be and can be described as a way of understanding and explaining what we know. Epistemology aims to provide a philosophical ground for determining what types of knowledge can be possible and how they can be legitimate and adequate.

3.3 Discussion and Rationale for Choice of Approach

Table 1

Research Philosophy Rationale

Research Philosophy	Design	Study Type	Approach
Interpretivism	Qualitative	Interviews, Observation	Inductive
Positivism	Quantitative	Social surveys, Questionnaires, statistics	Deductive
Pragmatism	Mixed Method	Explanatory/exploratory/descriptive	Both deductive and inductive

Note. Information collected from (Thompson, 2015).

3.3.1 Research Approach

An inductive approach was employed. VAR in Football is a relatively well-researched area (Mather, 2020a; Spitz et al., 2020; Tamir & Bar-eli, 2021). This study aimed to use a different perspective from previous research on VAR in football. The focus was on the exploration of the emotional element of VAR and professional players in particular. This is something that previous studies have not accounted for and there is little information on this available other than public player interviews surrounding the topic.

3.3.2 Methodical Strategy

Semi-structured interviews were used to provide in-depth qualitative data that can create a better understanding through narrative. A key aspect of sample size is the 'depth' of data as opposed to the numbers, so participants should represent the topic (O'Reilly & Parker, 2012). For research in this vein, Creswell et al. (2007) suggest between 5-25 and semi-structured/in-depth interviews. Based on this, 12 interviews were selected due to the depth of knowledge they aim to cover and to reach "saturation" in the data. Glaser and Strauss (1967) define saturation as when: "no additional data are being found whereby the researcher can develop properties of the category." An analysis based on grounded theory was taken, which is a research method used to generate new understandings and theories about social processes and human behaviours using data that have been systematically collected and analysed (Lewis-Beck et al., 2003). The theory building from grounded theory directs the researcher to hone in on emerging and key concepts to build theoretical categories to explain the phenomenon under study (Bluff, 2005). This corresponded with thematic analysis, which was used to collect results based on the themes that emerged from reading and identification by computer software, Leximancer.

3.3.3 Methodological Choice

The research is concerned with the emotional impact of VAR on players and fans. Denzin and Lincoln (2005) suggest that qualitative research is associated with an interpretive philosophy. This is because researchers need to understand subjective and socially constructed meanings describing the topic being studied (Saunders et al, 2012). As well as this, the literature review provided a strong base for qualitative research. As a result of this, the study uses a qualitative mono-method utilising in-depth personal accounts or documents that illustrate in detail how people think or respond within society. This was understood and interpreted through narrative.

A quantitative approach to this study would not have allowed for feelings to be captured and does not consider the meaning behind responses. The study used sentiment and analytical data as opposed to numerical.

3.3.4 Research Method

Explorative research was conducted to collect qualitative data, which formed the basis of this study. In-depth, semi-structured interviews were selected as the most appropriate primary research for collecting data. Secondary research will also be used to support the study, consisting of player and fan interviews, Twitter data, and other forms of web content. A total of twelve primary interviews will be conducted, six with players and six with fans which fit the selection criteria. Following this, data will be collated and analysed using thematic analysis.

3.3.5 Time Horizon

This study had a cross sectional time horizon, meaning the data was collected from participants at a specific point in time. Time is not a variable used in the study but it should be noted that cross sectional does not mean all data was gathered at the exact same point in time. There was a short timeframe during which fan interviews and player interviews were collected to avoid bias. Cross-sectional data was collected by semi-structured interviews. These were one-to-one interviews with the participant being questioned by one interviewer. The fan interviews were collected between March 13th 2022 and May 9th 2022. The player interviews were collected between March 18th and June 16th 2022.

3.4 Primary Research

3.4.1 Semi-Structured Interviews

The type of interview conducted in this research was semi-structured interviews. The study collected data from six football players and six football fans using a purposive sampling method. Participants were chosen based on two criteria: 1) Self-identification as a fan of a football club and, during the football season, spends at least one hour per week on activities related to a football team(s), such as watching/reading/listening/discussing. All six fans supported a club from the English Premier League, which at the time of data collection was the

only league in England to use VAR technology in the event of a 'clear and obvious error' during the UEFA Champions League, UEFA Europa League, EFL Carabao Cup and Emirates FA Cup. Semi-structured interviews made the interview flexible so relevant questions could be asked to obtain purposeful answers from the respondents. This way I was able to collect more information from each respondent, which provided me a greater depth of qualitative data to analyse. I aimed to ask questions that would reflect the interviewee's personal experiences and emotions related to VAR incidents. The semi-structured interviews provided me with rich and detailed answers that were analysed in terms of identifying themes and patterns incorporating each participant's interpretive philosophy. According to Bryman and Bell (2003), a semi-structured interview "refers to a context in which the interviewer has a series of questions that are in the general form of an interview schedule but is able to vary the sequence of questions." This method was chosen over others because it gave the interviewees the chance to respond to open questions and use personal stories or examples. After all interviews were done and recorded, they were transcribed to help with the process of identifying key themes.

3.4.2 Semi-Structured Interview Structure

Following a successful answer to spending at least one hour per week on activities related to a football team, respondents were asked to recall and describe a story involving VAR they had experienced whilst watching a game. The interviews followed with twelve or more questions across five focus topics that are listed below. The questions left room for elaboration in the form of informal conversation, allowing dialogue to proceed naturally. Each interview lasted between 15–25 minutes to avoid the interviewee losing focus and was audio recorded using Zoom or Voice Memos on an iPhone. The interviews were conducted one on one in person and/or on Zoom. Questions were asked in a non-biased way to avoid any influence on the respondent and maintain the validity of the data. All participants gave their informed consent before they took part in the study. All comments remained anonymous, which provided a guarantee of confidentiality. Audio recordings were later transcribed using Otter.io software and then thematically coded.

Player focus topics
Emotional impact, player experience, physical impact, sentiment, understanding
Fan focus topics
Emotional impact, fan experience, sentiment, application of VAR, understanding

One set of questions was for fans; one set was for players. The set of questions for fans included:

> During the football season, how many hours do you spend on activities related to a football team/s (like watching/reading/listing/discussing/playing)?

1. Please recall and describe a story involving VAR you have experienced whilst watching a game.
2. How do you feel about the use of technology to arbitrate football matches in general? VAR specifically?
3. Do you think there should be a time frame in which a referee should be allowed to review VAR decisions and for VAR decisions to be made?
4. Do you feel that fans watching on TV and at the stadium are well informed during a VAR check? If no, what are the emotions you experience? If yes, what about VAR checks makes you feel like that?
5. Do you think VAR has made watching football matches more or less enjoyable? Why?
6. Are you likely to attend fewer or more games in the future because of VAR?
7. Are you likely to watch fewer or more games in the future because of VAR?
8. Do you believe VAR has had a positive or negative impact on the team you support? Why?
9. Is VAR something that is conscious in your mind when watching a game?
10. Do you think that the usage of VAR adds or detracts from your emotional experience of football? "The way you interpret football games mentally"
11. What is the biggest difference you have found between watching a game with and without VAR?
12. What is your age, gender, and nationality?

The set of questions for players included:

1. Please recall and describe a story involving VAR you have experienced whilst watching a game. What was in your mind?
2. What is your opinion on the use of technology to arbitrate football matches in general?

3. Do you think VAR has made playing in football matches more or less enjoyable? Why?

4. Do you think there should be a time limit on referee VAR decisions?

5. Do you feel players are well informed during a VAR check?

6. What did you feel during a VAR check for your team and against your team?

7. Do you believe VAR has had a positive or negative impact on the team you play for? Why?

8. Has the implementation of VAR changed the way you train or prepare for games in any way?

9. Is VAR something that is conscious in your mind during a game that it is in use?

10. Do you think VAR plays any role in your decision making?

11. What is the biggest difference you have found between playing in a game with and without VAR?

12. Do you think that the usage of VAR adds or detracts from your emotional experience of football? "The way you interpret football games mentally".

13. What is your age, gender, and nationality?

3.5 Secondary Research

3.5.1 Secondary Interviews

Secondary research was used to back up the primary research. This involved using existing material from sources like the internet, libraries, and archives to collect interviews with players and fans. The secondary interviews were of players and were based around VAR with relevant questions and responses. In order to collect secondary interviews, the key words of "Player," "Interview," and "VAR" were searched on Google and YouTube with seven examples being taken from the first seven pages of results. These interviews were collected, collated, and organised into a table, then interpreted alongside the primary interviews, using thematic analysis on Leximancer.

3.6 Thematic Analysis

The data gathered from primary semi-structured interviews and secondary interviews was analysed using thematic analysis. Thematic analysis involves identifying themes and patters within interviews. It is a method for describing data, but also involves interpretation in the processes of selecting codes and constructing themes (Braun & Clarke, 2006). A distinguishing feature of thematic analysis is its flexibility to be used within a wide range of theoretical and epistemological frameworks, and to be applied to a wide range of study questions, designs, and sample sizes. Braun and Clarke (2006) argue that thematic analysis can stand alone as an analytic method and be seen as foundational for other qualitative research methods. To assist with the thematic analysis, I used Leximancer, a computer software that learns what the main concepts are in a text and how they relate to each other. It conducts a thematic analysis and a relational (or semantic) analysis of the interview data. Open coding was used to analyse each comment made across the complete dataset. All statements were read several times and grouped into axial codes comprising emerging themes, sub-themes, etc. The findings offer a significant account of fan and player opinions on VAR's impact on player and fan emotions. By the end of the process, six different themes emerged from the initial data analysis. Once the process was complete, the five reoccurring themes for fans were as follows: A New Dimension to Football; Experiencing the Moment; Thoughts and Feelings; Time/Flow; Fan Sentiment of VAR. The five reoccurring themes for players were: Clarity of VAR and Player Understanding; Fairness and Integrity; Thoughts and Feelings; Time/Flow; Player Sentiment of VAR. The outcome of this analysis was displayed in tables and graphs. These themes will form the framework of the findings and discussion below. The next chapter will analyse all the information gathered from the interviews and questionnaires. This information is then discussed, identifying any specific patterns, similarities or correlation within the data.

3.7 Twitter Sentiment Analysis

Twitter is a platform where people openly share their honest opinions and views. It is a useful platform to gather people's key messages due to its accessibility and limited word count. Twitter data was collected using VADER sentiment-analysis with an aim of supporting the study by understanding:

- Whether fans and players have positive or negative sentiments on VAR use
- The emotions associated with their tweets

VAR system was introduced in top flight European football league competitions by the Bundesliga and the Serie A at the beginning of the 2017–18 season.; the French Ligue 1 and Spanish La Liga introduced VAR at the beginning of the 2018–19 season; the English Premiere League introduced VAR at the beginning of the 2019/20 season. Due to these dates, to obtain the most accurate Twitter data using VADER Sentiment Analysis, I collected tweets from between 13th August and September 5th 2019, 2020, 2021 and 2022. This way at least the first 5 weeks of each of the major competitions would have been played. Each date range was limited to 5000 tweets. Tweets were classified on whether the sentiment was either positive, neutral, or negative. Kolbinger and Knopp (2020) conducted a study that explored fans' reception of VAR in the English Premier League using Twitter sentiment analysis, focusing specifically on English Premier League 2019/20 season games – the same season VAR was introduced. In the sentiment analysis used in my study, tweets only from 2019-2022 will be used to examine any changes in sentiment over time. The tweets were based on VAR use in general with the only restrictions being dates and English. To create a Twitter sentiment analysis, Python computer programming language was employed, using Jupyter, which is an interactive development environment for notebooks, code, and data. The VADER sentiment analysis package was also used (Hutto & Gilbert, 2014).

3.8 Experimental Procedure

3.8.1 Recruitment of Respondents

Convenience sampling was used to obtain a sample of professional players and football fans. This involved formally contacting players using the platform LinkedIn and Instagram. Football clubs were also emailed. Altogether, twelve interviewees were collected. Six of these were with professional football players. Six of these were with football fans. Interviewees were required to provide information on personal experiences and opinions. Fan respondents were recruited exclusively using the Facebook group 'England Football Fans NZ' and direct Instagram messages. To meet the fan criteria and be eligible for the interview, participants were asked: during the football season, how many hours do you spend on activities related to a football team/s (like watching/reading/listing/discussing/playing)? Those who answered <1 hours per

week were followed up on. This selection process was based on the fan definition: "A fan or fanatic, sometimes also termed an aficionado or enthusiast, is a person who exhibits strong interest or admiration for something or somebody, such as a celebrity or a sport or a sports team, a genre, a politician, a book, a movie, a video game or an entertainer." Participants were also required to be of at least 18 years of age. This was done in order to ensure participants were mature as well as old enough to have experienced football with and without VAR. There were no specific geographical requirements, although there was a focus on players in the Australian A League and English football fans.

3.8.2 Ethical Considerations

This study gained approval from the UC Human Research Ethics Committee. All those interviewed have remained and will remain anonymous. This study was completed using guidelines given by the Human Ethics Committee of the University of Canterbury. Prior to the data collection, the proposed research was reviewed and approved by the Committee. An information sheet and consent form was emailed to respondents prior to any data collection. The information sheet detailed a summary of what would be included in the study and interview. Additionally, the participants were informed of the terms and conditions of participating, the rights of withdrawal before submission, the confidentiality and anonymity of their responses, and finally, the storage process of the collected data. After participants were presented with the information sheet, they were required to give their full consent before they could commence the experiment. This was done by asking participants to confirm that they had read the information provided and understood the implications of participating. Then, participants were required to select either 'I have read the terms and conditions and I agree to participate in this project' or 'no, I do not wish to participate'. Participants' emails were required purely for contact and providing information on the study and will too remain confidential.

4. Research Findings

4.1 Introduction

This section will illustrate and display findings from the primary and secondary research retrieved from the qualitative methods of semi-structured interviews and the Twitter

sentiment analysis. The Leximancer outputs show a concept map with themes for both players and fans, highlighting them as 'concept cloud' that are associated to words. Based on the interviews and these clouds, five themes were established for players and fans. These themes are detailed in the findings using extracts related to each theme from the interviews. Following this, the Twitter sentiment analysis findings are presented in the form of graphs and tables based on the sentiment scores generated.

4.2 Leximancer Thematic Analysis

Figure 2

Fan Interview Concept Map
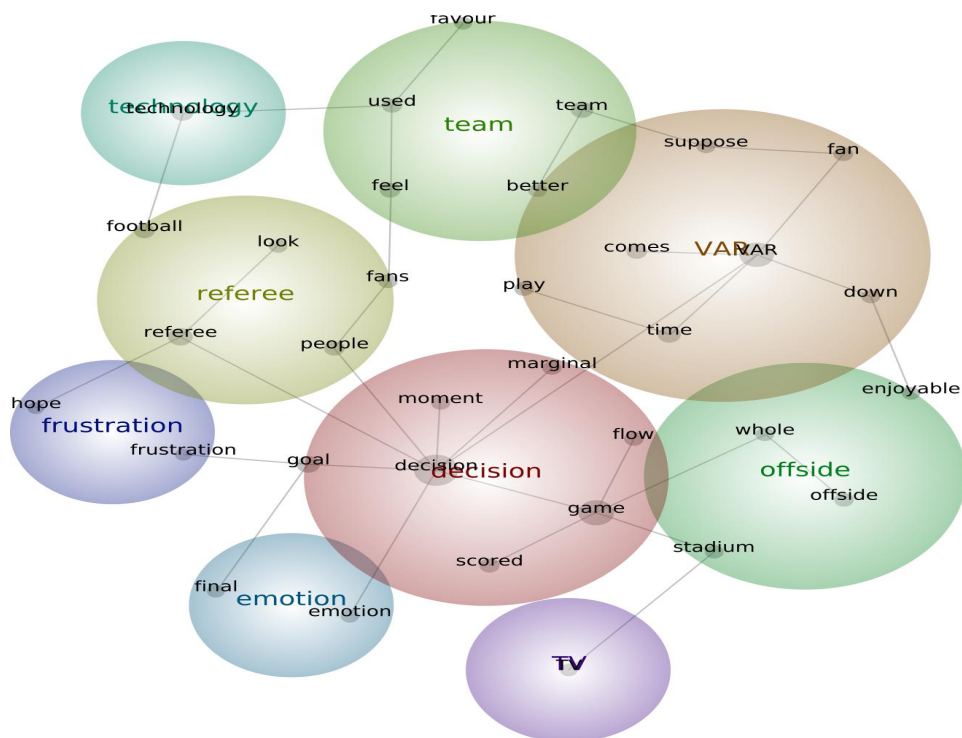
4.2.1 Fan Themes Identified

1. **Emotions and Feelings Relating to VAR (VAR, Emotion, Frustration)**
2. **Time/Flow (Decision, Referee, TV)**
3. **Application of Technology (Technology, Decision)**
4. **Experiencing the Moment (Decision)**
5. **Fan Sentiment on VAR (Team, VAR, Emotion)**

Figure 3

Player Interview Concept Map
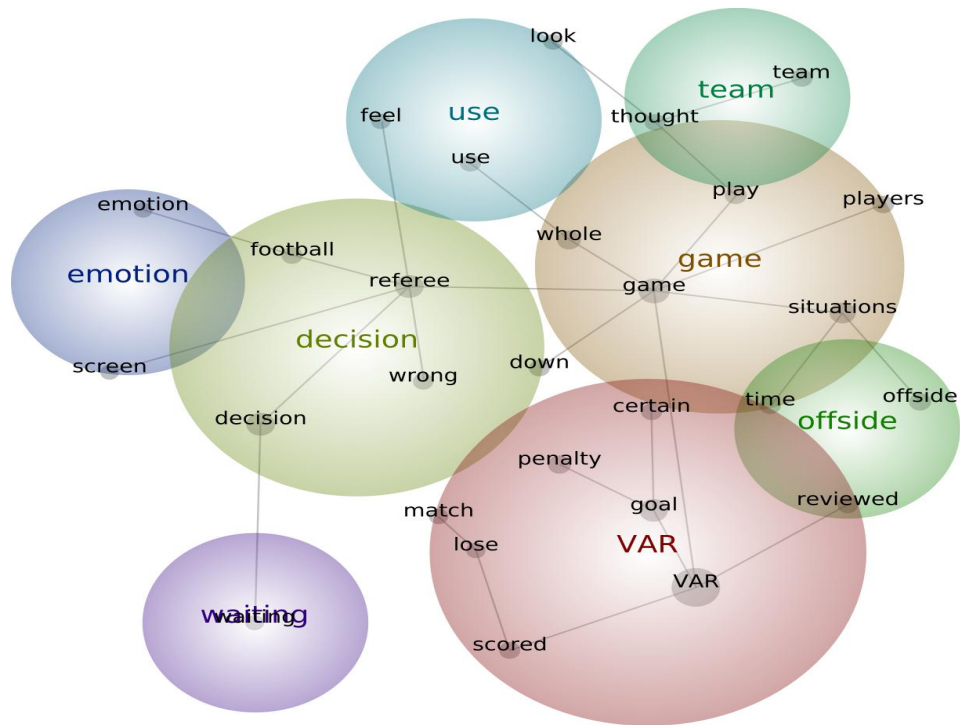
4.2.2 Player Themes Identified

1. **Emotions and Feelings Relating to VAR (Emotion, Use, VAR)**
2. **Time/Flow (Waiting, Game)**
3. **Clarity of VAR and Player Understanding (Use, Game, Decision, VAR)**
4. **Fairness and Integrity (Team, Emotion, Decision)**
5. **Player Sentiment on VAR (VAR, Use, Emotion)**

Note – Themes are based on each concept cloud (bubble) from the Leximancer output.

4.3 Fans

4.3.1 Emotions and Feelings Relating to VAR

This results of the semi-structured interviews revealed fans' strong emotional reactions to the usage and application of VAR in football games. Football is the most popular sport in the world due to its passionate fans and emotional essence (Shvili, 2020). The potential dilution to emotions resulting from VAR were an apparent theme from fan responses. Fans in this study had strong feelings about the accuracy and the functionality of the video assistant referee. Half (3/6) fans argued that VAR detracts from their emotional experience of football, although the remaining had mixed feelings, suggesting it creates new emotions. Fans 1 and 2 identified that VAR had brought a different element of emotion to football highlighting that it creates added anxiety and tension following important decisions such as goals and cards. Fan 3 felt that VAR added to their emotional experience of football due to regular VAR checks creating more uncertainty and a "good anxiety".

/Fan 1.txt

"It's like you say, it's the doubt and the hope that are different to that profound joy or massive disappointment. I guess it creates a different dimension of emotion from what you would normally have just watching a game of football, but I don't know. It changes the emotion. I don't know whether it adds or detracts because it gives you different emotions."

/Fan 2.txt

"You always hope for the best for your team but the emotions you get are very tense, nervous and anxious because you never really know what the VAR referee will do, especially with the inconsistencies in VAR checks. So, yeah, it adds and subtracts. I guess you could say it brings a different element of emotion to football."

/Fan 3.txt

"It sort of adds to the emotional experience. Quite a lot of goals that happen are often checked and you hope if it is against your team that it is not a goal and then if it's for your team you hope it is a goal and emotionally it creates more anxiety. But I believe that is a good anxiety."

In the semi-structured interviews, Fans recalled stories involving VAR situations and their emotional reactions in games they had watched. These accounts all questioned the precision

and presence of VAR during games and the impact that it has on a fan's emotional experience during a game. Delayed reactions based on VAR decisions and frustration of precise/marginal calls was a common area that participants discussed. Two of six fans described a story during a game on 18th October 2020 resulting in a 2-2 draw between Liverpool and Everton in the Merseyside Darby. Sadio Mane had scored with minutes remaining to give Liverpool the lead 3-2 but the goal was ruled off due to offside. Fans 1 and 5 suggested the decision was extremely marginal and questioned a VAR's ability to judge a call that tight following many replays. They also noted that rule changes used for the 2021/22 season would have allowed this goal to stand which included using thicker lines to make their determination which is made from the attacker's armpit. Following matches that are affected by VAR, decisions are reviewed by a five-strong independent panel comprising representatives of the Premier League and PGMOL as well as three former players (Nakrani, 2022).

/Fan 1.txt

"I remember thinking in my mind, it was close enough that they're going to have to review it. But still being pretty excited when the goal went in and thinking 'right, okay, we've won the game,' but still thinking it's going to go to a review, but they're going to rule it onside. I went through that roller coaster of emotion from 'yes, we've scored' to the immediate kind of emotional response to 'okay, be calm, because it's going to be reviewed,' and following that, just frustration and anger that the review ultimately disallowed the goal."

/Fan 5.txt

"I was sort of just waiting for the result they were going to push through because you never know VAR, the one thing I've found about VAR is the consistency is awful with it. You don't know what's going to happen, one time one decision will be given and the other time, it's not given. So I was just confused as a fan I guess."

Other fans found VAR to cause uncertainty and anxiousness. Fan 6 highlighted the different feelings VAR causes, such as confusion, as well as new feelings following goals.

/Fan 6.txt

"I know there's an argument for if it's the right decision that it shouldn't have been a goal, but you have that moment of glory and the spontaneity of sport and that's kind of why we love it, because of the highs and lows. With VAR, it's quite a different feeling. Whether players feel

that way or not I don't know, but as fans, you still celebrate, but then you just have the disappointment of having it ripped away from you. VAR is always conscious in my mind during a game because whenever a goal is scored, [I] instantly think how it could be taken away. Or vice-versa if a goal scored against you, like you're kind of looking for that final saving grace."

/Fan 5.txt

"Maybe if it's a final, then I'll be very anxious, like, around it."

/Fan 4.txt

"I think VAR detracts from my emotional experience of football because it makes me feel very confused, and decisions take so long, at big moments in the match, it really kills the excitement. I usually just feel really, like, uncertain and anxious. Honestly, sometimes I'm just interested to see what the decision will be because sometimes you just have no idea."

Two fans described emotions felt following decisions that were overturned in their supported team's favour. Fan 6's account was live at a game between Sheffield United and West Ham in 2020, finishing Sheffield United 1, West Ham 0.

/Fan 6.txt

"The score was 1-0, West Ham in the 90th minute and Sheffield United scored a goal which sent the away end West Ham fans into chaos, but shortly after, the goal was ruled out through VAR". "It was a pretty surreal feeling because up until that point I had been watching games on TV, but that was just completely different by actually physically experiencing it when you don't have commentators talking about what's going on and you can just see a screen in the corner that says 'VAR check thing' and you've got no idea what they're looking for". "I was just praying that it was going to go in Sheffield's favour and be overturned, there was a lot anticipation, and when it did go our way, it was like we had scored a second goal and the game finished 2-1 rather than 1-0."

/Fan 3.txt

"In the 90th minute Raheem Sterling scored, which would have given Manchester City a Champions League Semi-Final win on aggregate but VAR ruled out the goal during his

celebration, luckily for me, as a Tottenham Hotspur fan." "I went from pure disappointment to relief, I was just loving it!"

Based on these fan accounts, it seems fans are generally divided on the implications of VAR. It is also evident that VAR has changed the fan experience of watching football matches. The instant feelings of happiness or disappointment have now become delayed reactions of relief or frustration based on VAR rulings.

4.3.2 Time/Flow

The most dominant theme that was evident from the interviews was the disruption VAR has on the time/flow of the game. Question 11 highlighted this, which asked participants: what is the biggest difference you have found between watching a game with and without VAR?
A feature in responses surrounded how the flow of the game had changed with VAR checks and interruptions. There is no time limit on VAR checks and participants noted that checks often used plenty of time. It was evident from responses that the process of waiting on VAR checks disrupts fans' experience and emotions. Fans described the impact the disruption to the flow of the game has on emotions.

/Fan 1.txt

"You know, now it's very much about making the right decisions. And it doesn't really matter what that does to the flow and impact of the game. Because I think it comes down to that immediacy, like even if the team you support scores a goal, you know, straightaway, if it looks like it's a marginal call, that it's going to go to VAR before it can be awarded. So you're always conscious that there's going to be an interruption to the flow of the game. You can't outright celebrate a goal or, you know, outright be disappointed with a goal against you because you still know that VAR is going to come into play."

/Fan 3.txt

"Mainly the flow, and the time. The clock keeps going when VAR comes on so what happens is they end up adding a lot more time at the end which is a bit annoying in that aspect."

/Fan 5.txt

"I think the biggest difference without VAR is that there's no 'stop start' to the game so the flow of the game is much better. And you also see as well, when you're watching a game, you sort of enjoy maybe more shots and more pieces of skill as the game isn't stopped as much. So to me, the difference between with and without VAR is there being more enjoyment around it."

VAR decisions appeared to cause unnecessary suspense and aggravation during checks. In doing so fans suggested that some sort of time frame and tweaks for VAR checks could help.

/Fan 4.txt

"Yeah, I think there should be some sort of time frame, because sometimes when VAR does come into play, it can slow the momentum down."

/Fan 2.txt

"There should be a time limit. I think what they, what football, should do is implement something similar to the NBA where there should be a coach's challenge on a VAR decision. So there should be a timeframe when they should be able to do that."

/Fan 3.txt

"Yes, I think there should be a time limit because when I am watching at home, often it is clear and obvious what's happened but they still sit there and deliberate in their own head for 30 seconds which seems pointless. When a referee goes over to a monitor, you sort of know that the decision needs to be overturned."

/Fan 6.txt

"I think there should be a time limit. Linking it to cricket, it's like umpires call—if in 60 seconds you still can't decide, move on."

A popular response suggests that fans are of the opinion that VAR checks should require some form of timeframe to prevent long stoppages and large chunks of extra 'injury' time following 90 minutes.

4.3.3 Application of Technology

Fans in this study were all supportive of technology in football and the direction it is going but there was an obvious discontent among fans over the application of it. Fans thought that technologies that required no interpretation had been successful as there is no ambiguity; however, the application of VAR was causing arguments due to the human interpretation of decisions, and thus fans were suggesting completely computerised systems could be a solution. Participants understood that technological advancements were beneficial to football but stated that the utilisation of it could be clearer. For example, Fans 1 and 6 said:

/Fan 1.txt

"So technology in general, I don't think is the issue. I think it's how the technology is being utilised. It's how the technology is being deployed and how technology is being delivered with the human element and interpretation of the rules, which is the bigger problem."

/Fan 6.txt

"So I mean, there's definitely a place for it, but it just feels as though it's probably not quite right at the moment with football. I personally feel it should just be the black and white decisions like offside decisions and goal-line technology. Maybe the red cards, but I feel as soon as it's open to interpretation, that's when it gets messy. But anything that can be defined by a technical logical system, like the goal-line system, it's either over the line or it's not, there's kind of no room to argue."

4. /Fan 4.txt

"I think there is a lot of ambiguity because it all kind of comes down to the interpretation of the rules and like and the officials on the day, I think definitely adds, like, ambiguity."

Due to the laws of football, interpretation is an important part of decision making for referees. VAR may help with accuracy but the element of interpretation remains. Fans 5 & 6 felt tweaks could be made in regards to the way decisions are made.

/Fan 6.txt

"You can see the benefits of technology in terms of Rugby TMO decisions and the DRS system cricket uses that both work very smoothly. I think with VAR if there was tweaks to the system,

it could be really good. But I suppose that VAR as a system. From an emotional point of view, I don't particularly like it, as I just feel it impacts player and fan experience way too much."

/Fan 5.txt

"The way the world is going today, you have to use technology in sports. I think, for example, goal-line technology is great. That's perfect how it's used. VAR is, in my opinion, is a good thing, but the actual system around of how it's used needs work. So I feel like it can be tweaked a lot."

4.3.4 Experiencing the Moment

A prominent theme in the semi-structured interviews was surrounding the 'moment'. Fans shared that a large impact VAR was having on their emotional experience was the disruption of the moment caused by the presence of VAR. 5 out of 6 fans said that VAR was something they were conscious of during games and were thinking about following key moments such as goals or red cards. Fans had strong views on this aspect of VAR; for example, fans 3, 4, and 6 said:

/Fan 4.txt

"VAR is something I'm conscious of during a game because I know everything is being checked in the background. Everything I watch I'm wondering if my team will be affected by it."

/Fan 6.txt

"It almost takes me back to grassroots sports a little bit, because from a fan experience, without VAR, you can just watch in the moment and you know, whatever happens is guaranteed. Maybe as a player you want justice and fairness, but as a fan, my interpretation is that I'm happy to see the referee get a few decisions wrong, to know that everything that happens in the moment will stay that way."

/Fan 3.txt

"If a team scores a marginal goal in the 93rd minute and it gets allowed—that's obviously more exciting than VAR coming back and reviewing it and then disallowing the goal, because it sort

of ruins the whole atmosphere, and something that could have been really exciting to look back on in a couple years' time has been turned into almost a nothing moment."

4.3.5 Fan Sentiment on VAR

Fans had mixed opinions on their stance towards VAR. Although there was discontent, most fans accepted the inclusion of VAR but thought there various downsides. Fan 1 suggested VAR doesn't affect their reactions to important moments but questioned how the human element can keep up with technology:

/Fan 1.txt

"It's interesting because for me, it doesn't really change anything. I still celebrate a goal if it's scored, I still get nervous if a goal has been scored against my team that I'm supporting. I definitely do have mixed views, but I'm pretty much in favour of the VAR. It's more around how do you ensure that the human element keeps up with that?"

/Fan 6.txt

"As far as VAR as a system, and this probably goes more down the track of like the emotional side, but I don't particularly like it, as I just feel it impacts player and fan experience way too much because of the delay and the time that it takes."

Other fans, such as 2 and 3, had open views to VAR, with their standpoint being that football is a huge industry with a lot at stake, therefore the correct decision is most important.

Fan 2.txt/

"In general, I think there definitely is a place for VAR when there's billions of dollars on the line. You know, these players who get this one opportunity, and you don't want them getting cheated out of something that the referee doesn't see, and you want to pick up on the dirty side of football."

Fan 3.txt

"Well, VAR has it's downsides with the whole flow of the game and how it sort of ruins that. But when it comes down to it, it's about making the correct call. When you have referees, there

is obviously human error, and with video technology, they can pick up things that the referee can't see which is sometimes quite good."

Fan 5.txt

"In terms of VAR specifically, I think that it could be fantastic. I believe certain parts of it need to be fixed. There's still a lot of problems and a lot of people are unhappy with, like, certain decisions. And I think it needs to get to a point where everyone just kind of accepts all the decisions."

4.4 Players

Please note – all names and the accounts attached to them that are used in the following section are publically available throughout online media.

4.4.1 Emotions and Feelings Relating to VAR

Much like the fan interviews, the emotional impact of VAR was an evident theme of the primary and secondary player interviews and Leximancer analysis. Anxiety as well as hope were feelings various players described experiencing. For example, players 2, 3, 5 and Thiago Alcantara said:

/Player 2.txt

"It probably adds a bit more anxiety because you're waiting around doing nothing on the pitch for two, three minutes, just waiting for VAR decisions to be made."

/Player 3.txt

"I don't know what has happened. I definitely am quite suspenseful and anxious during VAR decisions. When there is a foul committed by the opposition team, I am encouraging of VAR, but if it's against my team, then I am just hopeful."

/Player 5.txt

"Yeah I am just hopeful. And then when the decision went in our favour, it's like a relief. When you see you see the referee signal for VAR, then you know there is a good chance they will change it, so you already start to celebrate. Even if the referee gets asked to view on the field screen, then this is, like, also great. Now they call him from the room and said 'you have to

change, maybe you have to change this decision.' You end up reading so much of the body language of the referee."

/Thiago Alcantara

"We make mistakes when we play, referees have to make mistakes, too. Lots of mythical moments wouldn't exist [with VAR]. And when you score, even a brilliant goal from the halfway line, you're waiting, thinking: 'I hope there isn't a foul in the build-up, I hope there's no offside, I hope'."

Players 1, 4, and Michail Antonio also described how they thought VAR disrupted their emotional experience of football during games.

/Player 1.txt

"I think VAR detracts from the emotional experience of football, because it has taken a decision that is sometimes made with emotion, replaced it with what could be viewed as a robot or a computer, and that's very much a non-emotional decision."

/Player 4.txt

"VAR definitely detracts from my emotional experience of football. It's that raw emotion everyone loves football for, because of the emotion you feel after scoring a goal and that's the most important thing. It's so hard to score a goal in football. It's one of those sports where the end goal of trying to achieve something, which is to score goals to win games, is the hardest thing to do. Sometimes your first reaction is 'oh, what a goal... oh, wait, he's offside because of VAR,' then it appears and the emotion's gone."

/Michail Antonio

"I've had a couple of goals disallowed by VAR. I thought 'I don't want to be there doing a dance and the goal gets disallowed.' I've toned down my celebrations. A couple of times I've been about to do one and had a handball or whatever... VAR has killed it."

4.4.2 Time/Flow

Once again, like the fan interviews, time/flow was a prominent theme in the player interviews. James Milner, and Player 3 explained that the VAR decisions often left them waiting for long periods of time following important moments of the game.

/James Milner

"You score, there's an explosion of noise and then it's VAR. You wait. Football is a game of human error on the field and in officiating as well. They have a very tough job and I'm all for making their lives easier – but not at the expense of the flow of the game."

/Player 3.txt

"There was one situation where there was a rough tackle that happened, and I remember having to wait a long time for the VAR result, and the stoppage was the most notable thing for me."

As a result of players waiting on decisions, players 4, 3, and Andy Rovertson describe this as interfering with the 'flow of the game'.

/Player 4.txt

"When there's a large stoppage in play, it brings down the whole momentum of the game and you can use it to your advantage if you're a team that's under pressure, and hope that something will be checked by VAR, because it can take a little bit of the sting out of things. Without VAR, you've just got the beauty of flowing football."

/Player 3.txt

"I think VAR shouldn't overrule the referee. I think that should be the referee's decision if they want VAR to check it, but I don't think VAR needs to interfere to avoid the flow of the game being ruined."

/Andy Rovertson

"I used to love going to games and just being in that moment of being able to celebrate a goal. That is being taken out of the game a wee bit. Now you are waiting two or three minutes to see

if a goal is onside or offside and for me, if it is that tight, then leave it to whatever decision was originally made."

4.4.3 Clarity of VAR and Player Understanding

A standout theme from the player interviews was players' clarity around VAR and their understanding during games. Players 6, 3, 1, and Connor Coady recalled their experiences of VAR and what they were aware of during VAR's usage.

/Player 6.txt

"No, players are not well informed on VAR decisions. Because the only information we know is if it's being reviewed, and that's mainly from reading the body language of the referee. It's just a period of no information until the decision is made."

/Player 3.txt

"I think players are not well informed. There has been multiple occasions that I have felt like they go to VAR and I have no idea what is being checked for, or even what part of the game that they're looking at."

/Player 1.txt

"No, I don't think there's any idea of what exactly they're doing. But I think a lot of players should be comfortable with decisions being made if they're behind it. It would help a lot if decisions are explained like they are in the NFL or NBA, where certain decisions are made over a booth with microphones. I think this would help with confrontation around referee decisions."

/Connor Coady

"They did a presentation at the start of the season and told us what was going to happen but it's still confusing, you still can't get your head around it – you don't get answers on the pitch, they don't tell you 'right, we're checking for a penalty, we're checking for handball, we're checking for offside'… Okay, so who's offside? 'We don't know'. Okay, so how far offside? 'We don't know – we don't get told'."

These responses suggest this is a problematic area for players and the transparency between players and referees is minimal when it comes to VAR decisions.

4.4.4 Fairness and Integrity

Fairness and integrity was a clear theme based on the interviews and Leximancer analysis. This theme was not apparent in the fan interviews but featured heavily among players. Players felt that VAR helped with fairness and integrity by increasing the accuracy of decisions. Players 2 and 5 express this, stating:

/Player 2.txt

"Playing with VAR I think I have a bit more faith in myself, because I think it's there to protect you where if the referee makes a wrong call on your behalf, you might get looked after by the VAR. Once I played with VAR a couple of times, I've kind of wanted it the whole time to make sure that all the decisions are fair, and big decisions will get checked twice. The referees are always going to make some mistakes."

/Player 5.txt

"If you've trained the whole week, and in the end, it's a wrong decision from the referee that cost you the win or promotion or relegation or whatever – I think that football is too big a business for that, so obviously the situation's it's goal or no goal is the biggest change."

Kevin De Bruyne echoed fans' views that the interpretation on rules when using VAR causes problems but, besides this, accepted VAR because it helps make the right decisions:

/Kevin De Bruyne

"Obviously, sometimes it's not nice because you score a goal and then you have to wait for a VAR check and all that stuff, but on the other hand, when the decisions are right, they are right. There is always a lot of debate, but I don't think the problem is VAR, it's the rules that sometimes make the difficulties for the referees." "If the rules are clear, that makes it easier for everybody, but the fact there is still a lot of debate about VAR means the rules are not clear or they seem to be changed all the time - but that's just my opinion. "

4.4.5 Player Sentiment on VAR

Players satisfied with VAR explained that it was necessary with the direction football is going and that the influence it has on correcting decisions outweighs any potential limitations. Players 1 and 6 emphasize this:

/Player 1.txt

"Yeah, I think it's necessary at this point. I do think there's still an element of human error with VAR and that is what people who are against VAR kind of support, is the element of human error and human emotion that is kind of involved in football matches."

/Player 6.txt

"I like it. I think it's correct, I think. I think there are so many situations in that, before VAR, would alter the whole course of the game. Momentum's a huge part of it, but also one goal, or one red card, can have such a huge influence on a game. I think you know, as we see, in all the top leagues with how many goals are decided by VAR. I think that proves that it is quite useful, because it's clearly, you know, changing many results across the leagues."

Alcantara, Coady, Robertson, and Milner expressed a different perspective, saying:

/Thiago Alcantara

"I have that 'hate modern football' mentality; I'm more classic in attitude. And then there's VAR, which I've always opposed."

/Connor Coady

"It's affecting the game. The crowd are singing it, the crowd don't like it, and no one likes it. No one has asked the players about it. People talk about VAR but they don't ask us about the situation. For me, it's not working. Some people are saying it gets the right decision but we're the players on the pitch and it doesn't feel good, believe me.

/Andy Robertson

"We need a serious discussion about VAR. Sure I'm not alone in feeling like they are falling out of love with the game in its current state. It is affecting players, but it is affecting the whole game."

/James Milner

"I'm not a fan at all. It might just be the old school part of me but I think there's still too much debate around VAR. Goal-line technology is incredible. Instant decision. Black and white. But

it's very hard to use VAR when you've still got opinions on the decisions and the atmosphere is being ruined."

4.5 Twitter Sentiment Analysis

Jupyter Notebook and VADER were used to collect Twitter data based on tweets related to VAR to determine sentiment. Jupyter is a web-based interactive computing platform and VADER (Valence Aware Dictionary and sEntiment Reasoner) is a lexicon and rule-based sentiment analysis tool that is specifically attuned to sentiments expressed in social media. Within this program, there is a list of words that each have a sentiment score attached to them – the program looks for these words in the tweets and then aggregates the sentiments.

Each sentiment score represents the proportion of text that falls into the categories of either positive, negative, or neutral. The compound score is used to calculate the sum of all the lexicon ratings which have been normalized between -1 and +1. With -1 being extreme negative and +1 being extreme positive (Kung, 2020). This measure can vary between +1 and -1. Below are the results based on tweets containing 'VAR Decision' between 13th August and September 5th 2019, 2020, 2021 and 2022, wherein at least the first 5 weeks of each of the respective 5 major European competitions would have been played by this stage. Each date range was limited to 5000 tweets.

Table 2

Example of Tweet Scores based on 13th August-September 5th 2019

Sentiment	Tweet n	Date Created	Tweet
Negative score example (0.365) Positive score example (0.0) Neutral score example (0.635)	4990	2022-0-04	Omg. That penalty decision is an absolute shocker #cheated #var
Negative score example (0.0) Positive score example (0.24) Neutral score examples (0.76)	38	2019-09-04	1-0 Kawasaki at the break and they have been the better team. Taking advantage of Nagoya's high line with countless balls over the top. VAR has had 2 decisions to make and got both correct, so a good start there!
Negative score example (0.067) Positive score example (0.075) Neutral score example (0.858)	1	2019-09-04	QUESTION: If you could reverse a controversial decision in any game before VAR was created, what would it be and why? #TFC #ESPN

Figure 4

Average Positive Score between 13th August-September 5th 2019 and 13th August-September 5th 2022
(5000) Tweets
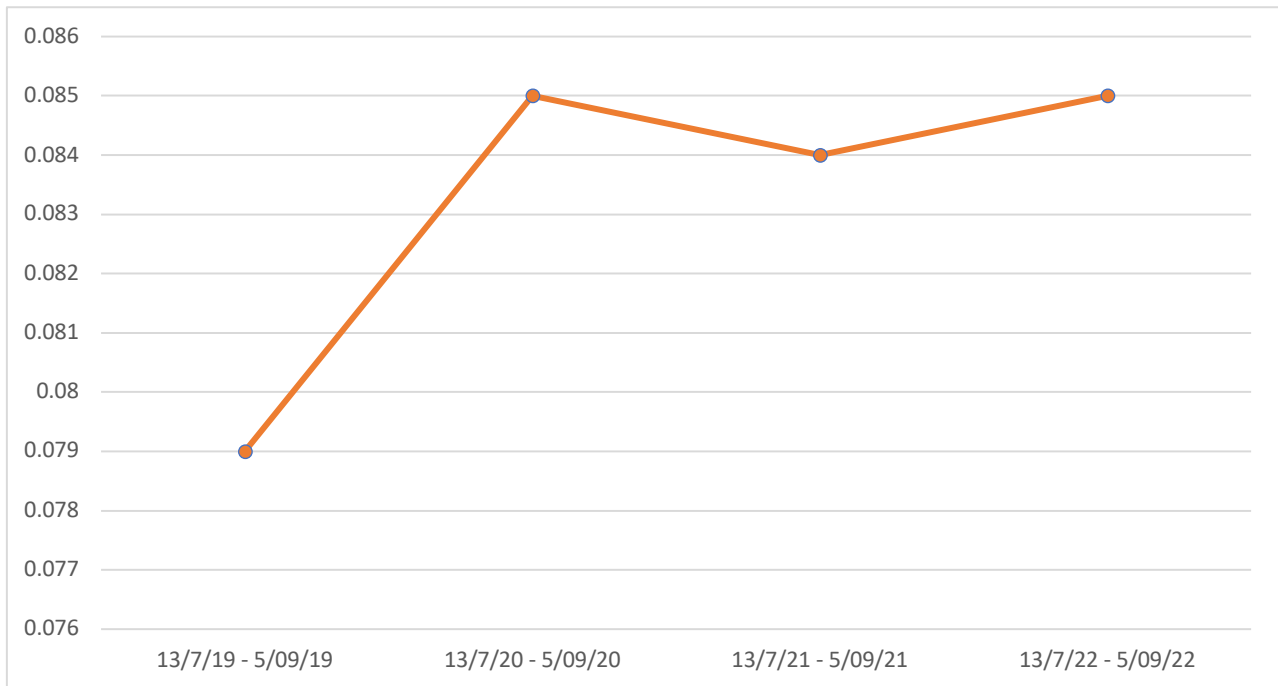
- Tweets including 'VAR Decision' were 7.9% positive during this time period in 2019.
- Tweets including 'VAR Decision' were 8.5% positive during this time period in 2020.
- Tweets including 'VAR Decision' were 8.4% positive during this time period in 2021.
- Tweets including 'VAR Decision' were 8.5% positive during this time period in 2022.

There was little variation in tweets across 2019-2022, although 2019 was notably low in comparison at 7.9% positive. This was during the year VAR was introduced across many major top flight leagues which may explain why a lower positive sentiment was recorded that year.

Figure 5

Average Negative Score between 13th August-September 5th 2019 and 13th August-September 5th 2022
(5000) Tweets

- Tweets including 'VAR Decision' were 12.9% negative during this time period in 2019.
- Tweets including 'VAR Decision' were 11.2% negative during this time period in 2020.
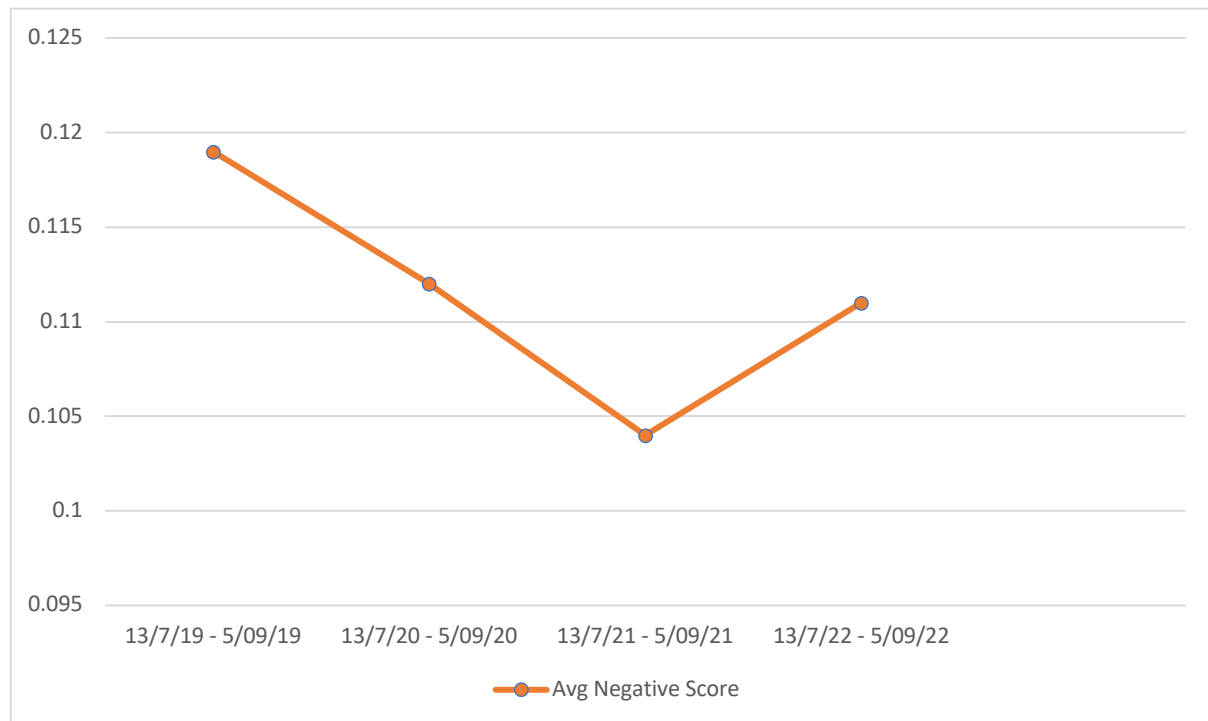- Tweets including 'VAR Decision' were 10.4% negative during this time period in 2021.
- Tweets including 'VAR Decision' were 11.1% negative during this time period in 2022.

Negative sentiment was initially much higher in 2019 compared to following years at 12.9%. Similarly to the positive sentiment, this may be due to the introduction of the technology which fans were unfamiliar with. Across 2020 and 2021, negative sentiment decreased by 2.5% during this time, perhaps due to adjustments made to the VAR technology (Kinsella, 2021).

Figure 6

Average Neutral Score between 13th August-September 5th 2019 and 13th August-September 5th 2022
(5000) Tweets

- Tweets including 'VAR Decision' were 80.3% neutral during this time period in 2019.
- Tweets including 'VAR Decision' were 80.3% neutral during this time period in 2020.
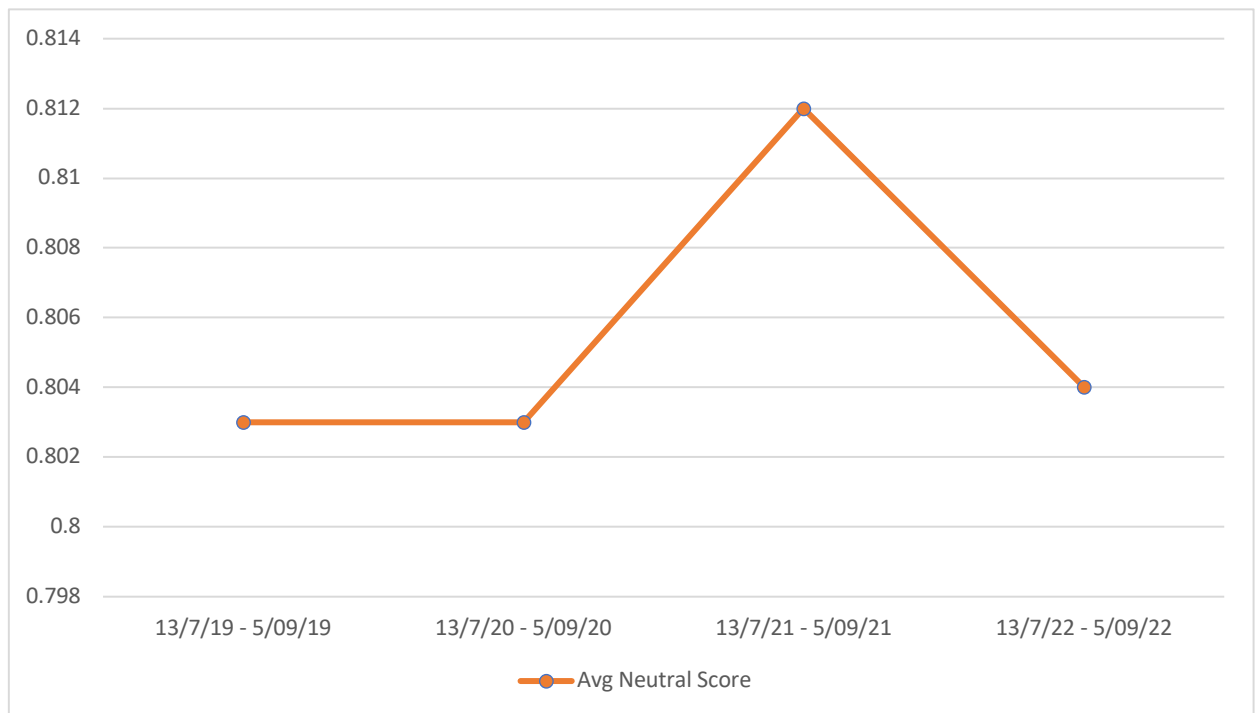- Tweets including 'VAR Decision' were 81.2% neutral during this time period in 2021.
- Tweets including 'VAR Decision' were 80.4% neutral during this time period in 2022.

Tweets had a very neutral sentiment in general, with a small spike in 2021, coinciding with the aforementioned VAR adjustments. In line with an increase in negative sentiment in 2022, neutral tweets were reduced back to 80.4% in 2022 suggesting fan sentiment is heading back in a negative direction.

Figure 7

Negative/Compound Score between 13th August-September 5th 2019 and 13th August-September 5th 2022
(5000) Tweets

The negative/positive compound score signifies how many negative tweets there are for every positive tweet. For example, if you have a negative/positive score of 1.5, this indicates that for every positive tweet, there are 1.5 negative tweets.
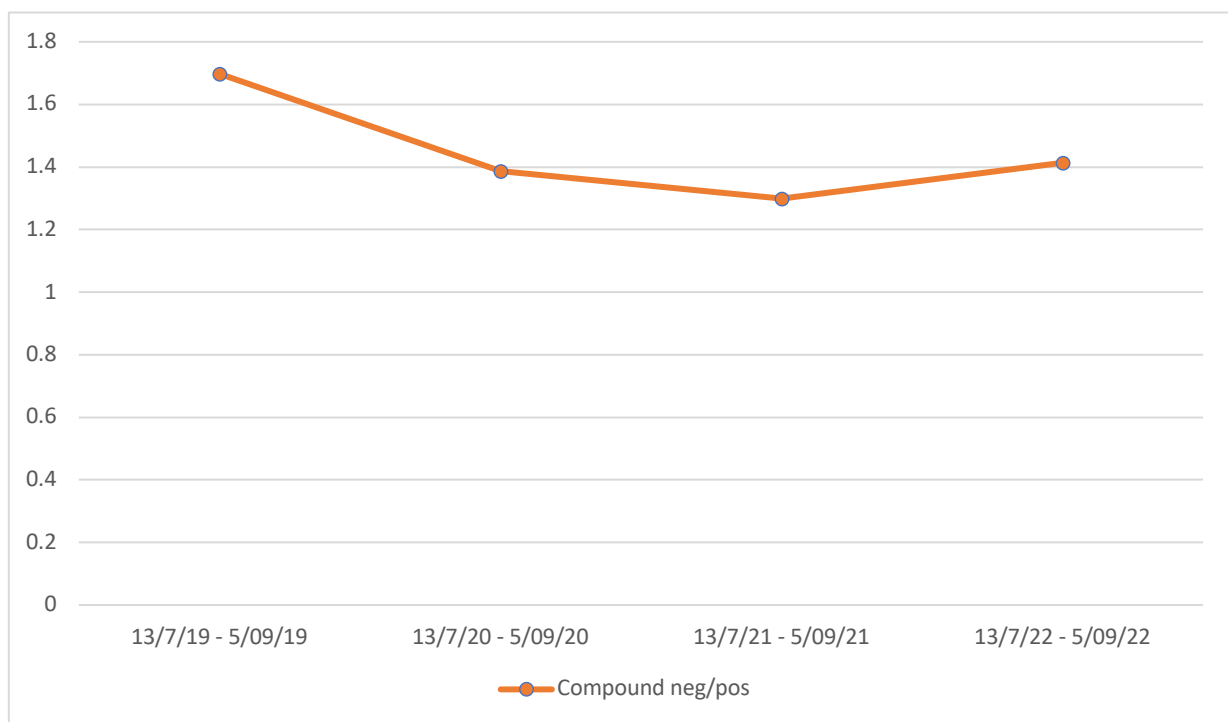
- Tweets including 'VAR Decision' had a 1.698 negative/positive compound score in 2019.
- Tweets including 'VAR Decision' had 1.386 negative/positive in 2020.
- Tweets including 'VAR Decision' had a 1.299 negative/positive score in 2021.
- Tweets including 'VAR Decision' had a 1.413 negative/positive score in 2022.

Figure (7) puts the results of figures 4, 5 and 6 into perspective. For example, a negative score of 12.9% in 2019 and a positive score of 7.9% in 2019 may seem insignificant; however, figure (7) illustrates that in 2019 for every positive tweet, there were 1.698 negative tweets, thus suggesting there were substantially more tweets with a negative sentiment related to VAR that year.

Figure 8

Average Compound Score between 13th August-September 5th 2019 and 13th August-September 5th 2022
(5000) Tweets
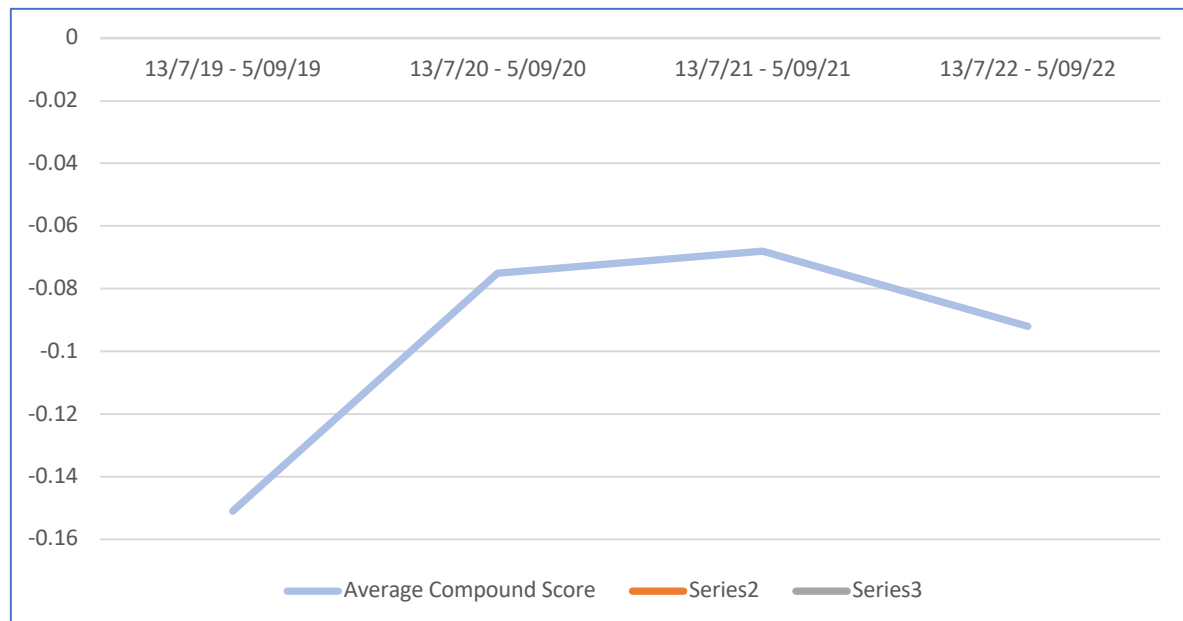
- Tweets including 'VAR Decision' had an average compound score of -0.151 in 2019.
- Tweets including 'VAR Decision' had an average compound score of -0.075 in 2020.
- Tweets including 'VAR Decision' had an average compound score of -0.068 in 2021.
- Tweets including 'VAR Decision' had an average compound score of -0.092 in 2022.

The compound score is the sum of the valence score for each word in the glossary and it determines the degree of sentiment as opposed to the actual scores used in figures (4, 5 and 6). The value can be between +1 which is extremely positive sentiment and -1 which is extremely negative sentiment (Keita, 2022). As a rule:

- a positive sentiment, compound ≥ 0.05
- a negative sentiment, compound ≤ -0.05
- a neutral sentiment, compound between -0.05, 0.05

Figure (%%) shows that all date-ranges have a normalised compound score of ≤ -0.05 and an average compound score of -0.096 meaning the overall sentiment of tweets is negative. This is a reliable metric as it encompasses the overall sentiment.

Table 3

% Change between 13th August-September 5th 2019 and 13th August-September 5th 2022

Date Range	Avg Positive % change	Avg Negative % change	Avg Neutral % change	Compound neg/pos % change	Average Compound Score % change
13th August-September 5th 2022	0.079 → 0.085 7.5% increase	0.119 → 0.111 6.7% decrease	0.803 → 0.804 0.124% increase	1.698 → 1.413 16.7% decrease	-0.151 → -0.092 39% increase

Table 4

Total average scores of the time periods between 13th August-September 5th 2019 and 13th August-September 5th 2022
Total Tweets: 5000

Date Range	Avg Positive	Avg Negative	Avg Neutral	Compound neg/pos	Average Compound Score
All	0.083	0.115	0.806	1.449	-0.096

- Tweets including 'VAR Decision' from the combined time periods on average are 8.3% positive, 11.5% negative, and 80.6% neutral

- Tweets including 'VAR Decision' from the combined time periods on average have a compound score of -0.096

Table 5

Average scores of tweets containing "VAR Emotion" between time periods across 13th August 2019-September 5th 2022. Total Tweets: 5000

Date Range	Avg Positive	Avg Negative	Avg Neutral	Compound neg/pos	Average Compound Score
13th August 2019-September 5th 2022	0.103	0.121	0.776	1.179	-0.039

5. Discussions and Conclusions

5.1 Introduction

The discussion section of this chapter shall explain the findings gathered and the reasoning behind these findings. The findings will also be discussed using relevant literature and secondary data which is related to the topic. Looking back, the aim of this study was to address if the implementation of VAR is having an impact on football players and fans emotional experience of football and provide insight into the preference of absolute accuracy and justice, or the raw emotional experience of the beautiful game, with all its rights and wrongs. The study was guided by the following two objectives:

(i) This research will use semi-structured interviews with football fans and professional players to attempt to explore if VAR affects their emotional experience.

(ii) To use Twitter sentiment analysis to explore the sentiment of tweets and understand if there are any themes with the semi-structured interviews.

The research question attempted to explore what impact VAR has on players' and fans' emotional experience of football, therefore, the discussion section will aim to analyse the findings section and provide and explain an answer to this research question.

There has been a considerable amount of research surrounding technology in sport. However, these previous studies have not focused specifically on VAR or the emotional impact it is having on both players and fans and, as a result, how this could impact the sport. There is an obvious gap in research as some of the closest studies (Berg, 2020; Hasmund & Scelles, 2021; Scanlon et al., 2022) focus specifically on fans' perception of VAR, not the emotional response by fans as well as players. The majority of previous studies related to VAR were also done prior to adjustments made to the technology by major leagues over 2021 and 2022, including thicker lines, armpits and handball rule changes (Brand, 2021). These adjustments may have altered the perception of VAR based on the success of changes. This research aimed to build on this previous literature as well as create new knowledge.

5.2 Interpretation of Main Findings

5.2.1 Player Interviews

1. Emotions and Feelings Relating from VAR

There was a common attitude that VAR detracted from players' emotional experience of football due to the emotional human element that is taken away by using VAR technology. Overall, players indicated that during VAR checks they often experienced feelings of anxiousness, suspense and hopefulness. Players felt that the time during VAR checks caused them to become hopeful that a decision was going in their favour and that their emotions of anxiousness, suspense and hopefulness were enhanced because they were not felt in the moment, but rather following lengthy reviews. There was a pervasive feeling that when a referee signalled for a VAR check, the initial decision would be overturned and players read into the body language of referees. Multiple players mentioned that celebrations were somewhat of an afterthought, due to VAR checks intervening following goals.

2. Time/Flow

The findings suggested that players felt VAR disrupted the time and flow of football and as a result also caused a disruption to emotions. Notably, there was a pattern that VAR caused a lot of waiting following critical moments in games and this was detrimental to the flow of the game and momentum. Suggestions were made that it should be the on-field referee's decision as opposed to the video assistant referee's to make decisions on whether VAR should be used to check something, and that if calls such as an offside were highly uncertain, then they should be left as the original decision.

3. Clarity of VAR and Player Understanding

Findings demonstrated a clear lack of understanding amongst players when it came to VAR decisions. The results suggested that this was due to a lack of information provided regarding VAR decisions. There was a consensus across the players that they were not well informed during the decisions and the information they received was based on referee body language and a screen displaying what call is being checked for e.g. handball, offside. Players said that the issue is they knew what type of call was being checked for, but no details were provided, such as what part of the game or what players were involved. One player suggested a process like the NFL and NBA use, where decisions are explained over a booth with microphones; this

way players would have more understanding of decisions made and it may help with confrontation around referee decisions.

4. Fairness and Integrity

The findings suggested that fairness and integrity of football matches were crucial to players and that VAR helped assist with that. Players felt that VAR was helping make the right decisions which could subsequently lead to repercussions like relegation and promotion, which is very important in the scheme of football as a business. There were comments made regarding the clarity of rules, and players also felt like VAR offered some protection in regards to VAR helping out with incorrect calls on their behalf.

5. Player Sentiment on VAR

There was mixed sentiment on the usage of VAR among players with a split opinion of some players stating they liked it and felt its usage was correct, as well as necessary, with the direction football is going in. The players that had a negative sentiment towards it had very strong opinions, stating "they were falling out of love with the game", "the atmosphere is being ruined". Notably, Connor Coady mentioned that "people talk about VAR but they don't ask us (players) about the situation" and Andy Robertson stated that VAR "is affecting players, but it is affecting the whole game". These particular statements point to the motive behind this study and the gap that has been missing in previous research.

In summary, interviews with professional players pointed out that VAR is detracting from their emotional experience of football due to the removal of the human element that is diminishing the emotional aspect of the sport. Anxiousness and hope were two common feelings resulting from VAR decisions. As well as this, players felt VAR created more suspense which could be better described as an emotional amalgam, comprised of fear and hope (Smuts, 2009). The additional time caused by VAR checks enhances these emotions and disrupts the instant emotional reaction. This is related to the time and flow of football, which players felt was being disrupted by lengthy decisions during key moments. The findings indicated that, despite these views, players had a preference for fairness and integrity within football, which VAR assists with. Because football is a huge business, decisions in matches could affect promotion, relegation, and player contracts. For this reason, players were happy that the purpose of VAR was to make the correct decisions. Finally, there was a mixed sentiment of positive and negative views of VAR, suggesting the overall sentiment among players is relatively neutral.

5.2.2 Fan Interviews

1. Emotions and Feelings Relating to VAR

The findings suggested fans were unsure whether VAR added to or detracted from their emotional experience of football, but rather felt that VAR had created a different dimension of emotion to football where doubt and hope are the prominent emotions as opposed to joy and disappointment. Inconsistencies in decisions caused fans to feel confused and anxious, although hope was the most common emotion mentioned, due to common VAR checks following key moments. When recounting stories, one fan suggested that the experience of a moment of glory and the spontaneity of sport following goals was why they loved sport, due to the highs and lows, but that VAR creates different feelings. This was consistent with statements by others who discussed the quick change in emotions going from pure disappointment to relief.

2. Time/Flow

Results showed that fans collectively felt VAR was causing a big disruption to the time and flow of football games. This is because VAR is focused on making the absolute correct decision but does consider the flow of the game or the time it takes to review key moments. Fans suggested there should possibly be some form of time frame for decisions to be made and if no decision based on VAR could be reached within said time frame, to stay with the original referee's decision. Fans also suggested a 'manager's challenge' or a system similar to umpire's call in cricket.

3. Application of Technology

Findings suggested fans were all in support of the usage of technology in football as that is the direction the world is moving in as further technological advancements are made. Findings did show, however, that technology was not the issue; rather, it is how technology has been applied that is a problem. Fans felt that, due to the interpretation behind decisions and human error, there is currently too much ambiguity and that improvement and tweaks need to be made. Cricket and rugby were both referred to as sports that contained video decision systems that work smoothly. Goal-line technology was mentioned as a successful technical logical system based on black and white decisions.

4. Experiencing the Moment

Findings highlighted that this theme was prominent among fans with a consensus that VAR was something they were conscious of during games. Fans felt they were often actively thinking about VAR during key moments, and how their team would be affected by it. Because of this, fans felt that, prior to VAR, one could watch in the moment and 'whatever happens, happens,' but the introduction of VAR has meant incredible goals and moments were being 'robbed'. This relates back to the emotions and feelings relating to VAR, as fans felt VAR ruined the moment because nothing was guaranteed.

5. Fan Sentiment on VAR

The findings showed there was mixed sentiment around VAR. This was due to the understanding that VAR is meant to be used to make the correct decisions, which is important for the business of football as there is a lot at stake; however, from an emotional standpoint, it impacted fan experience too much, because of delays, interpretation, and human element. The sentiment was relatively neutral, but fans did think there was large scope for tweaks and improvements.

In summary, the indications based on semi-structured interviews with fans had similarities to the players, but there were also notable differences. The first indication based on the findings is that fans felt VAR had created a different element or dimension of emotion to football, due to the suspense it adds. Research by Smuts (2009) suggested that suspense is comprised of both fear and hope, which are feelings not too dissimilar from doubt and hope, the prominent emotions felt by fans during VAR interventions. Like the players, fans felt VAR caused a disruption to the time and flow of football. For fans, however, this was due to there being too much of a focus on making the absolute correct decision. The interviews also indicated that fans were always conscious of the usage of VAR and thought it ruined 'the moment' and spontaneity in football matches, as key moments were not guaranteed. Finally, much like the players, there was mixed sentiment on VAR technology that was predominantly neutral, but for fans, there were more negatives than positives.

5.2.3 Twitter Sentiment Analysis

The findings from the Twitter sentiment analysis indicated that the overall sentiment based on tweets containing "VAR decision" was predominantly neutral with an average neutral score of 80.6% over 13th August 2019-September 5th 2022 (using data from 13th August -September 5th

for each year). Despite this, using the same date range, the average negative score of tweets was 11.5%, while the average positive score was 8.3%, explaining the average compound score of -0.096. From the negative sentiment compound being ≤ -0.05, it can be understood that the tweets had a negative sentiment on average. This is consistent with the semi-structured interviews of fans and players who were asked how they felt about VAR specifically. The responses suggested that fans, as well as players, were overall relatively neutral, due to mixed opinions of both positive and negative.

The Twitter sentiment analysis also aimed to determine if there were any obvious changes in sentiment between 13th August-September 5th 2019 and 13th August-September 5th 2022. The analysis found an increase in average positive sentiment score in tweets of 7.5%, a decrease in the average negative sentiment score of 6.7%, and a 1.24% increase in the average neutral sentiment score in tweets. This may suggest VAR was trending in the right direction in terms of its support, but the increases in positive sentiment and decreases in negative sentiment are so minor that it is not significant in terms of the size of effect. Adjustments were made to VAR across 2021-2022, during which negative sentiment increased by 6.7%, which may be a response to these changes.

5.3 Understanding the Findings in Relation to the Research Question

The findings met expectations of the study in serving to provide relevant information to answer the research question. There was no expectation to find ground-breaking results, but more of a focus on exploring if the usage of VAR was having any impact on the emotional side of football for players and fans. There was an aim to explore more than just fans' and players' stances on whether they were in favour or not in favour of the video assistant referee technology and instead to understand how it altered the way fans and players experience football matches mentally. The study is concerned with the emotional experience which is the result of what impacts the person, and how these situations are comprehended and signified by the person (Nogueira, 2014). The findings identified various themes and patterns, including a key indication as to how VAR has created a different dimension of emotion in football.

Players and fans suggested VAR creates a different atmosphere, as both sets of players and fans are often waiting for a decision during key moments. This atmosphere could be described

as a combination of suspense and drama (Toskin, 2018). Banerjee (2019) also recognised this different dimension to football in their blog post about the video assistant referee in 2019. In this study's semi-structured interviews, fans and players referred to hope and doubt as the most common emotions they experienced during VAR decisions. As well as this, fans and players consistently mentioned that VAR created a lot of suspenseful moments. As referenced previously, research by Smuts (2009) on the paradox of suspense revealed that suspense can be described as an emotional amalgam, comprised of fear and hope, where uncertainty, if it is required, is implied in the components. The emotions of doubt and hope mentioned by players and fans can be compared to the fear and hope that make up the paradox of suspense. This is a key indication to help answer the research question. The semi-structured interviews suggested that both fans and players felt VAR decisions took lengthy amounts of time, causing unnecessary suspense and aggravation during checks. Fans, as well as players, collectively felt that VAR was disrupting the time and flow of football games as there was too much of a focus on making the correct decision. There was a pattern that VAR caused a lot of waiting following critical moments in games, and this was detrimental to the flow of the game and momentum.

In concordance with previous literature (Badrov, 2021; Mm & Nimkar, 2020; Winand et al., 2021), fans supported the use of technology in general, but there remains little information on players. There were thoughts expressed that some technologies were more effective than others, but overall the use of technology in football was deemed appropriate and useful. Echoing a study by Berg (2020), there was a recurring theme between players and fans that there exists too much ambiguity with the current format of VAR. Because of this, fans and players suggested that some sort of time frame and tweaks for VAR checks could help, which was also suggested in a study by Scanlon et al. (2022) on perceptions of VAR by English Premiere League fans. Further findings from the semi-structured interviews included the suggestion of a 'manager's challenge' or a system similar to what the NBA or ICC uses. Another suggestion was that decisions could be made and explained over a speaker like the NFL. There were further thoughts that if VAR decisions were too close to call, then they should be left as the original decision made by the on-field referee.

Players and fans were asked about their opinion of VAR in general, with findings suggesting that the sentiment of both fans and players was very similar. The overall sentiment was very neutral, although different positives and negatives were discussed, the negatives tending to be slightly more prominent. This demonstrated a relationship with the Twitter sentiment analysis

which indicated that the overall VAR sentiment is predominantly neutral with an average neutral score of 80.6%. However, results did indicate that the average negative score of tweets was 11.5% and the average positive score was 8.3%, resulting in an average compound score of -0.096, thus suggesting tweets were slightly more negative than positive (a negative sentiment, compound score ≤ -0.05)

There were some noteworthy differences between the fan and player interviews, with players showing a clear preference for the fairness and integrity of football. This meant that players placed greater value on VAR's function of assisting with making correct decisions. This was a key point among players that fans tended not tend to focus on. Players further explained that, with the amount at stake in football, they wanted games to be as fair as possible, with correct decisions and outcomes. In this way, the players also recognised that VAR offered some protection for them as players.

Another difference between players and fans was that players had much more of an opinion that VAR was detracting from their emotional experience of football. Part of the reason for this may be related to the lack of understanding regarding VAR decisions that players attested to. There was a consensus across the players that they were not well informed during these decisions, and that the information they received was based on referee body language and a screen displaying the call being checked for.

5.4 Research Implications and Contributions

5.4.1 Theoretical Contributions

Various studies called for additional research into the impacts VAR is having on elite football (Hasmund & Scelles, 2021; Orelli, 2020; Winand et al., 2021). Winand et al. (2021) suggested future studies could investigate the longitudinal perceptions of football fans regarding VAR once it is established in most national and international competitions. This study explored the above through the Twitter sentiment analysis, looking at possible changes in sentiment over 2019-2022. Winand et al. (2021) also called for more research on how VAR impacts football stakeholders, particularly fans, and also an examination of the extent to which the spirit of the game is affected. This study aimed to address both of these aspects, as well as examining the impact on players, following the suggestion of Hasmund and Scelles (2021): "other key stakeholders include players and managers. Future research should include these stakeholders

to measure for differences". Finally, Hasmund and Scelles (2021) also stated that "a question on usage of VAR monitors could have included a note on time consumption to establish a link, future researchers should consider this if they want to compare these factors". This was incorporated into the semi-structured interviews. This study contributed to building on previous research and addressing the gap, revealing various indications. Furthermore, this study provides a new insight into the usage of VAR as the findings suggest that VAR has created a new dimension of emotion in football for both fans and players. The usage of VAR has created more suspense and drama following key moments in matches. As a result of this, it could be argued that doubt and hope are the prominent emotions experienced by fans and players as opposed to joy and disappointment. This is a new contribution to literature as past literature did not explore the emotional aspect to VAR nor any involvement of professional players. In addition, this study examined fan perception of VAR, which was seen to be more negative than positive but overall very neutral; this sentiment was also reflected by the players, although players expressed a preference for fairness and integrity, as opposed to fans' preference for experience and entertainment.

5.4.2 Practical Contributions

This research sought to provide further insight and evidence to help all those who want to contribute to improving the game quality, structure, reaction, and general advancement of application and functionality of VAR technology in football. This study offers advice for governing bodies and football associations around the world regarding management decisions when deciding upon the use or refinement of VAR in their respective leagues, as well as current associations that use it and whether they should continue doing so. It is important to consider fans as well as players with decision making as both are major stakeholders that hold a major influence on football in general. Many players have voiced their opinions, such as English Premiere League defenders Connor Coady and Andrew Robertson who feel there is not enough focus on them as players. Players and fans are at the center of football, therefore it is crucial they are carefully considered to ensure there is a balance of absolute accuracy and justice, and the sheer emotional spectacle that football is. This study showed that both fans and players were accepting of technology in football, more specifically VAR, but nonetheless felt that there is still a level of ambiguity that is hindering its usage. The study will provide practical advice on possible refinements, such as a decision review system, coach's challenge, or a reduction in

the time taken. Finally, this study also sought to find comparisons and differences between players and fans to understand if similar emotions are experienced between these two groups.

5.5 Limitations and Potential Future Research

This study had some limitations that could be accounted for when conducting future research. The first limitation is related to the semi-structured interviews, in which all respondents were over the age of 18. This could be considered a limitation for the fans because it meant that each fan had experienced watching football with and without VAR. Participants knew what football was like before VAR and had now experienced the change. Younger fans that started watching football with VAR already present would not have the same sense of what football was like prior to VAR. Including fans that have only known football with the usage of VAR may generate different responses and opinions.

Another limitation is related to the Twitter sentiment analysis, which is relatively broad. The Twitter data did not focus on one particular league, fan base, or team, and was based on the words "VAR Decision". Additionally, negativity bias may have been a factor, which is a cognitive bias that results in adverse events having a more significant impact on our psychological state than positive events (Cherry, 2022). Twitter is an avenue to quickly share thoughts on events so this may draw more negative reactions than positive. In saying this, the Twitter data does appear valid based on its relationship and similarities with thoughts expressed in the semi-structured interviews. Similarly, the semi structured-interviews may feature some bias due to social identity theory. This is based on the study by Winand et al. (2021) which suggests some rationale behind the "differences in fan identification levels, where fans who strongly identify with their favourite team experience less VAR satisfaction".

Lastly, a limitation of the semi-structured interviews is that the fans were all based in New Zealand, where the top flight football league (New Zealand National league) does not use VAR. Only one fan had experienced VAR at a live football match. Therefore, in conjunction with Winand et al. (2021), a recommendation would be an investigation involving supporters who attend live football matches regularly; this may result in interesting responses based on the participants' identification as fans and from the live experience. Furthermore, a

recommendation would be too consider the view of football referees and managers to understand their stance on various areas surrounding the usage of VAR.

5.6 Conclusions

This study is the first to explore the emotional impact of VAR among football players and fans. As well as that, this study is the first study relating to VAR to include accounts from professional players. This study aimed to provide an introductory insight into the impact that VAR has on players and fans emotional experience of football. To do so, a Twitter sentiment analysis was conducted and semi-structured interviews were done in conjunction with Leximancer thematic analysis to reveal themes of fans' experience, including emotions and feelings relating from VAR, time/flow, and application of technology, experiencing the moment and fan sentiment of VAR. In addition to the recurring fan themes, five player themes were established: emotions and feelings relating from VAR, time/flow, clarity of VAR and player understanding, fairness and integrity and player Sentiment of VAR.

The findings and discussion within this study illustrate that VAR is having more of an effect than its intended purpose of correcting 'clear and obvious errors'. Fans and players highlight that VAR creates consistent feelings of doubt and hope, due to the suspense it creates during key moments in matches. They also felt that VAR in its current form is ambiguous and disruptive to the time and flow of football matches. Despite this, it is clear that technological advancements are the future of football, as supported by the findings of this study. Integrating technology and human means is an area that can continue to be explored in football, with VAR already experiencing some success, but players and fans alike have indicated that adjustments to the technology are required, particularly around how it is applied in matches. VAR is now used in the majority of top-flight football worldwide and has established itself as a part of the game; therefore, the aim of this study is not to take away from this, but to better illuminate how VAR could be more closely aligned with fans' and players' emotional experience. We hope the research will encourage researchers and governing bodies to investigate further the application of technology in football and its impact on all stakeholders, and provide useful information to promote the growth and advancement of football, as well as furthering the application of VAR across professional football leagues worldwide.

References

Al-Amoudi, I., & O'Mahoney, J. (2015). Ontology. *SSRN Electronic Journal*, 1. https://doi.org/10.2139/ssrn.2566915

Albanese, A., Baert, S., & Verstraeten, O. (2020). Twelve eyes see more than eight. Referee bias and the introduction of additional assistant referees in soccer. *PloS one, 15*(2), e0227758. https://doi.org/10.1371/journal.pone.0227758

Alder, J. P. (2015). *Meaning and Sensemaking in High Performance Sport: Managing Chance in the High Performance Unit of a National Sport Organisation.* [Doctoral dissertation, University of Auckland]. https://apo.org.au/sites/default/files/resource-files/2015-11/apo-nid110166.pdf

Badrov, M. (2021). *Survey reveals technology enhances 76% of fans' enjoyment of sport.* Soccer Scene. https://www.soccerscene.com.au/survey-reveals-technology-enhances-76-of-fans-enjoyment-of-sport/

Bairner, A. (2014). Emotional grounds: Stories of football, memories, and emotions. *Emotion, Space and Society, 12*, 18-23. https://doi.org/10.1016/j.emospa.2013.11.005

Banerjee, S. (2019). Video Assistant Referee - Pros And Cons. *Chase Your Sport.* https://www.chaseyoursport.com/Football/Video-Assistant-Referee-Pros-And-Cons/1243

Berg, L. v. d. (2020). Video Assistant Referee: Spectator and Fan Perceptions and Experiences, *International Journal of Social Sciences and Humanity Studies, 12, 2*. ISSN: 1309-8063

Biscaia, R., Correia, A., Rosado, A., Ross, S., & Maroco, J. (2012, 06/01). The effects of emotions on football spectators' satisfaction and behavioral intentions. *European Sport Management Quarterly, 12*, 227-242. https://doi.org/10.1080/16184742.2012.679949

Bluff, R. (2005). Grounded theory: the methodology. In I, Holloway (Eds.), *Qualitative research in health care* (pp. 147-167). London: Open University Press.

Boyko, R., Boyko, A., & Boyko, M. (2007). Referee bias contributes to home advantage in English Premiership football. *Journal of Sports Sciences, 25*, 1185-1194. https://doi.org/10.1080/02640410601038576

Brand, G. (2021). What's new for 2021/22? VAR, thicker lines, armpits and handball rule changes for new season. *Sky Sports.* https://www.skysports.com/football/news/11095/12361221/whats-new-for-2021-22-var-thicker-lines-armpits-and-handball-rule-changes-for-new-season

Braun, V., & Clarke, V. (2006, January 1). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Bryman, A., & Bell, E. (2015). Business research methods (Fourth ed.). Oxford University Press.

Burrell, G., & Morgan, G. (1979). *Sociological Paradigms and Organisational Analysis: Elements of the Sociology of Corporate Life*. Heinemann.

Chandler, M. (2021). Why is VAR Not Working in Football? Retrieved 26/4/21, https://sqaf.club/why-is-var-not-working-in-football/

Cherry, K. (2022). What Is the Negativity Bias? *verywellmind.* https://www.verywellmind.com/negative-bias-4589618.

Coakley, J. J. (1994). *Sport in Society: Issues and Controversies*. Mosby.

Collis, J., & Hussey, R. (2014). *Business research: A practical guide for undergraduate and postgraduate students*. Palgrave Macmillan.

De Bruyne, K. (2020). 'I don't know the rules anymore!' - De Bruyne questions law changes after Man City defeat. Dom Farrell. Retrieved 10/6/21, https://www.goal.com/en-gb/news/i-dont-know-the-rules-anymore-de-bruyne-questions-law/1dhme2167dxxf1wzcshjstqrb7

Des, G., as cited in, A. Young, R., & Collin, A. (2004). Introduction: Constructivism and social constructionism in the career field. *Journal of Vocational Behavior*, 64(3), 373-388. https://doi.org/10.1016/j.jvb.2003.12.005

Dixon, T. (2012, October 1). "Emotion": The History of a Keyword in Crisis. *Emotion Review, 4*(4), 338-344. https://doi.org/10.1177/1754073912445814

Durkheim, E. (1968). *The Elementary Forms of the Religious Life. Translated From the French by Joseph Ward Swain*. Allen & Unwin.

Dyer, B. (2015). The controversy of sports technology: A systematic review. *SpringerPlus, 4*, 524. https://doi.org/10.1186/s40064-015-1331-x

Edirisingha, D. P. (2012). Interpretivism and Positivism (Ontological and Epistemological Perspectives). https://prabash78.wordpress.com/2012/03/14/interpretivism-and-postivism-ontological-and-epistemological-perspectives/

Ejnavarzala, H. (2019, April 1). Epistemology–Ontology Relations in Social Research: A Review. *Sociological Bulletin, 68*(1), 94-104. https://doi.org/10.1177/0038022918819369

Elleray, D. (2020). History of VAR. Retrieved 9/6/21, https://www.premierleague.com/news/1293198

Erikstad, M. K., & Johansen, B. T. (2020). Referee Bias in Professional Football: Favoritism Toward Successful Teams in Potential Penalty Situations [Brief Research Report]. *Frontiers in Sports and Active Living, 2*(19). https://doi.org/10.3389/fspor.2020.00019

Errekagorri, I., Castellano, J., Etxeazarra, I., & Peñas, C. (2020, 07/02). The effects of the Video Assistant Referee system (VAR) on the playing time, technical-tactical and physical performance in elite soccer. *International Journal of Performance Analysis in Sport, 20,* 1-10. https://doi.org/10.1080/24748668.2020.1788350

Esteban-Guitart, M., & Moll. (2014, 03/05). Funds of Identity: A new concept based on the Funds of Knowledge approach. *Culture & Psychology, 20*, 31-48. https://doi.org/10.1177/1354067X13515934

Ezurmendia Álvarez, J., & Valenzuela Saldías, J. (2021). Sport, and referee decision: About video assistance [Review]. *Revista Chilena de Derecho y Tecnologia, 9*(2), 52-72. https://doi.org/10.5354/0719-2584.2020.54706

FIFA. (2021). *Football Technology*. Retrieved 26/4/21, https://football-technology.fifa.com/en/media-tiles/video-assistant-referee-var/

Fletcher, T., & Stoney, E. (2020). 'Are fans in the stands an afterthought?' Sports events, decision-aid technologies and the Television Match Official in rugby union. *Communication & Sport, 9*(6), 1008–1029. https://doi.org/10.1177/2167479520903405

Gottschalk, C., Tewes, S., & Niestroj, B. (2020). The Innovation of Refereeing in Football Through AI. *International Journal of Innovation and Economic Development, 6*, 35-54. https://doi.org/10.18775/ijied.1849-7551-7020.2015.62.2004

Gratton, C., & Solberg, H. (2007). *The Economics of Sports Broadcasting*. Routledge.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In *Handbook of qualitative research.* (pp. 105-117). Sage Publications, Inc.

Gulhane, D. P. T. F. (2014). Various Types of Advanced Technologies in Sports. *Journal of Sports and Physical Education, 1*(6), 2347-6745.

Hamilton, T. (2019). Women's World Cup shows VAR still has room for improvement. *ESPN*. Retrieved 18/4/21, https://www.espn.co.uk/football/fifa-womens-world-cup/story/3882851/womens-world-cup-shows-var-still-has-room-for-improvement

Han, B., Chen, Q., Lago-Peñas, C., Wang, C., & Liu, T. (2020, 2020/12/01). The influence of the video assistant referee on the Chinese Super League. *International Journal of Sports Science & Coaching, 15*(5-6), 662-668. https://doi.org/10.1177/1747954120938984

Hasmund, T., & Scelles, N. (2021). Fans' Perceptions towards Video Assistant Referee (VAR) in the English Premier League. *Journal of Risk and Financial Management, 14*, 573. https://doi.org/10.3390/jrfm14120573

Heidegger, M. (1977). *The Question Concerning Technology*. Garland Publishing, INC. Harper & Row. https://monoskop.org/images/4/44/Heidegger_Martin_The_Question_Concerning_Technology_and_Other_Essays.pdf

Hilvoorde, I., & Vos, R. (2007, 04/01). Flopping, Klapping and Gene Doping. *Social Studies of Science, 37*, 173-200. https://doi.org/10.1177/0306312706063784

Hire Intelligence. (n.d.). *The Evolution of Technology in Sport*. Retrieved 24/20/21, https://www.hire-intelligence.co.uk/evolution-of-technology-in-sport/

Hudson, L. A., & Ozanne, J. L. (1988). Alternative ways of seeking knowledge in consumer research. *Journal of Consumer Research, 14*(4), 508-521. https://doi.org/10.1086/209132

Hunt, M. (2017). *Decision Review Systems within Sports: An Investigation of Decision Review Systems within Sports and the Impact these Technologies have on Spectators.* [Doctoral dissertation, Cardiff Metropolitan University]. https://repository.cardiffmet.ac.uk/bitstream/handle/10369/8744/HUNT%2C%20Mitchell%20Dissertation.pdf?sequence=1&isAllowed=y

Hutto, C., & Gilbert, E. (2014, 05/16). VADER: A Parsimonious Rule-Based Model for Sentiment Analysis of Social Media Text. *Proceedings of the International AAAI Conference on Web and Social Media, 8*(1), 216-225.

Ihde, D., & Zorn, D. M. (1994). *A Hermeneutics of Technology: Don Hide's Postmodern Philosophy of Technology.* [Master's thesis, McMaster University]. https://macsphere.mcmaster.ca/bitstream/11375/24658/1/zorn_diana_m_1994Mar_masters.pdfIzard, C. E. (2010, October 1). The Many Meanings/Aspects of Emotion: Definitions, Functions, Activation, and Regulation. *Emotion Review, 2*(4), 363-370. https://doi.org/10.1177/1754073910374661

Jackson, E. (2021). IFAB update on possibility of fans hearing conversations between referees and VAR. Retrieved 8/6/21, https://www.manchestereveningnews.co.uk/sport/football/football-news/ifab-var-manchester-united-city-19958908

Janhuba, R. (2019, December 1). Do victories and losses matter? Effects of football on life satisfaction. *Journal of Economic Psychology, 75*. https://doi.org/10.1016/j.joep.2018.09.002

Jones, M. V., Coffee, P., Sheffield, D., Yangüez, M., & Barker, J. B. (2012). Just a game? Changes in English and Spanish soccer fans' emotions in the 2010 World Cup. *Psychology of Sport and Exercise, 13*(2), 162-169. https://doi.org/10.1016/j.psychsport.2011.10.008

Keita, Z. (2022). *Social Media Sentiment Analysis In Python With VADER* Towards Data Science. https://towardsdatascience.com/social-media-sentiment-analysis-in-python-with-vader-no-training-required-4bc6a21e87b8#:~:text=compound%20corresponds%20to%20the%20sum,(most%20e

xtreme%20positive%20sentiment).Kinsella, R. (2021). Here are the VAR changes coming to the Premier League this season. *Pundit Arena.* https://punditarena.com/football/rudi-kinsella/var-changes-premier-league-season/

Kolbinger, O., & Knopp, M. (2020). Video kills the sentiment-Exploring fans' reception of the video assistant referee in the English premier league using Twitter data. *PloS one, 15*(12), e0242728-e0242728. https://doi.org/10.1371/journal.pone.0242728

Kung, S. (2020). *Sentiment Analysis with VADER*. GitHub.6/09/22, from https://github.com/sidneykung/twitter_hate_speech_detection/blob/master/preprocessing/VADER_sentiment.ipynb

Lago-Peñas, C., & Gómez-López, M. (2016). The Influence of Referee Bias on Extra Time in Elite Soccer Matches. *Perceptual and Motor Skills, 122*(2), 666-677. https://doi.org/10.1177/0031512516633342

Lewis-Beck, M. S., Bryman, A., & Liao, T. F. (2003). *The SAGE encyclopedia of social science research methods*. Thousand Oaks, Calif. London: SAGE.Loland, S. (2003). Technology in Sport: Three ideal-Typical Views and Their Implications. *Journal of Sport Studies, 2*, 1-11.

Lundberg, H. (2007). Sports As Entertainment: A Case Of Kitsch In The Experience Economy. In D. Hjorth, *Entrepreneurship and the Experience Economy* (pp. 181-207). Copenhagen Business School Press. Retrieved 20/4/21, from https://www.researchgate.net/publication/326477778_Sports_As_Entertainment_A_Case_Of_Kitsch_In_The_Experience_Economy

Mather, G. (2020, 11/13). A Step to VAR: The Vision Science of Offside Calls by Video Assistant Referees. *Perception, 49*, 030100662097200. https://doi.org/10.1177/0301006620972006

Mm, N., & Nimkar, N. (2020). Fan Perception Towards the Usage of Technology in Football. *Annals of Tropical Medicine & Public Health, 23*(17). https://doi.org/http://doi.org/10.36295/ASRO.2020.231731

Nakrani, S. (2022). Referees' body in effect admits controversial VAR decisions were wrong. *The Guardian.* https://www.theguardian.com/football/2022/sep/04/premier-league-request-review-of-controversial-var-decisions

New Zealand Football. (2020). *Shaping Football in New Zealand*. https://www.sporty.co.nz/asset/downloadasset?id=3af58547-c7b9-432c-b775-d6e8526c2db0

Nogueira, A. L. H. (2014, 2014/03/01). Emotional experience, meaning, and sense production: Interweaving concepts to dialogue with the funds of identity approach. *Culture & Psychology, 20*(1), 49-58. https://doi.org/10.1177/1354067X13515939

NZF. (2021). *New National League competition details confirmed*. Retrieved 25/4/21, https://www.nzfootball.co.nz/newsarticle/100552

NZSSSC. (2020). *Census Reports*. Retrieved 24/4/21, https://www.sporty.co.nz/nzsssc/Education/School-Sport-NZ-Census-Reports?em=0&ts=0.9548624399056846

O'Reilly, M., & Parker, N. (2012). "Unsatisfactory Saturation": A Critical Exploration of the Notion of Saturated Sample Sizes in Qualitative Research. *Qualitative Research*, 190-197. https://doi.org/10.1177/1468794112446106

Ogden, M. (2017). VAR creates as much confusion as clarity in Confederations Cup final. *ESPN.* Retrieved 8/6/21, https://www.espn.com/soccer/blog/the-match/60/post/3151551/var-creates-as-much-confusion-as-clarity-in-confederations-cup-final

Omoregie, P. (2016). The impact of technology on sports performance. *In Proceedings of INCEDI 2016 Conference 29th-31st August.*

https://www.researchgate.net/publication/333808384_THE_IMPACT_OF_TECHNO
LOGY_ON_SPORT_PERFORMANCE

Orelli, C. (2020). *How did the introduction of the Video Assistant Referee (VAR) modify the game and how could the new challenge concept be implemented in the Serie A league?* [Bachelor's thesis, Geneva Business School]. https://gbsge.com/media/mbehkx3u/orelli-claudio-2020-how-did-the-introduction-of-the-video-assistant-referee-var-modify-the-game-and-how-could-the-new.pdf

Paasch, D. R. (2019). *Dr. René Paasch: Tatsachenentscheidungen von Schiedsrichtern im Fussball*. Retrieved 20/4/21, https://www.die-sportpsychologen.de/2019/11/dr-rene-paasch-tatsachenentscheidungen-von-schiedsrichtern-im-fussball/

Premier League. (2020). *VAR*. Retrieved 24/20/21, https://www.premierleague.com/VAR

Review, W. P. World Population Review. Retrieved 27/07/21, https://worldpopulationreview.com/country-rankings/most-popular-sport-by-country

Robertson, A. (2020). Andy Robertson warns VAR is making people fall out of love with football. Andy Hunter. Retrieved 10/6/21, https://www.theguardian.com/football/2020/nov/30/liverpool-andy-robertson-warns-var-is-making-people-fall-out-of-love-with-football

Roger-Monzó, V. (2015). The evolution of television sports broadcasting through new technologies: Football as a paradigm in Spain. *Fonseca : Journal of Communication, 10*, 118-145.

Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research methods for business students* (7th ed.). Pearson.

Scanlon, C., Griggs, G., & McGillick, C. (2022). 'It's not football anymore': perceptions of the video assistant referee by english premier league football fans. *Soccer & Society*, 1-13. https://doi.org/10.1080/14660970.2022.2033731

Shvili, J. (2020). *The Most Popular Sports In The World*. WorldAtlas. https://www.worldatlas.com/articles/what-are-the-most-popular-sports-in-the-world.html#:~:text=Football%2C%20better%20known%20as%20soccer,following%20of%204%20billion%20fans.

Sidhu, G. (2011). *Instant Replay: Investigating statistical analysis in sports.* University of Alberta, Edmonton, Canada]. https://www.arxiv-vanity.com/papers/1102.5549/

Sinclair, J. (2019). *Collins English Dictionary*. HarperCollins.

Smith, C. A., & Lazarus, R. S. (1991). *Emotion and Adaptation*. Oxford University Press USA. https://people.ict.usc.edu/~gratch/CSCI534/Readings/Smith&Lazarus90.pdf

Smolka, A. L. B. (2016). Experiência e discurso como lugares de memória: a escola e a produção de lugares comuns. https://periodicos.sbu.unicamp.br/ojs/index.php/proposic/article/view/8643630

Smuts, A. (2009). The Paradox of Suspense. *Stanford Encyclopedia of Philosophy, 2009*(6.1), 1-15.

Spitz, J., Wagemans, J., Memmert, D., Williams, A., & Helsen, W. (2020). Video assistant referees (VAR): The impact of technology on decision making in association football referees. *Journal of Sports Sciences, 39*, 1-7. https://doi.org/10.1080/02640414.2020.1809163

Sumner, M. (2006). The SAGE Dictionary of Social Research Methods. In. SAGE Publications, Ltd. https://methods.sagepub.com/reference/the-sage-dictionary-of-social-research-methods https://doi.org/10.4135/9780857020116

Tamir, I., & Bar-eli, M. (2021). The Moral Gatekeeper: Soccer and Technology, the Case of Video Assistant Referee (VAR). *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.613469

Tamminen, K., Crocker, P., & McEwen, C. E. (2014). Emotional experiences and coping in sport: How to promote positive adaptational outcomes in sport. In (pp. 143-162).

Taylor, M., & Callahan, J. (2005, 05/01). Bringing Creativity Into Being: Underlying Assumptions That Influence Methods of Studying Organizational Creativity. *Advances in Developing Human Resources, 7*, 247-270. https://doi.org/10.1177/1523422305274529

Thompson, K. (2015). *Positivism and Interpretivism in Social Research*. https://revisesociology.com/2015/05/18/positivism-interpretivism-sociology/

Thonhauser, G., & Wetzels, M. (2019, 2019/05/04). Emotional sharing in football audiences. *Journal of the Philosophy of Sport, 46*(2), 224-243. https://doi.org/10.1080/00948705.2019.1613159

Toskin, R. (2018). Video Assistant Referee: VAR added drama and suspense. *The Standard*. https://www.standardmedia.co.ke/sports/World%20Cup%202018/2001286077/video-assistant-referee-var-added-drama-and-suspense

Trochim, W. (2006). Social Research Methods Knowledge Base. Retrieved 22/3/21, from https://conjointly.com/kb/

Trossard, L. (2019). I know not to celebrate because of VAR, says Brighton winger Trossard. Harry Deacon. Retrieved 10/6/21, https://www.90min.com/posts/6441472-leandro-trossard-admits-var-introduction-has-affected-his-immediate-celebration-of-goals

Turner, J. H. (2001). Positivism: Sociological. In N. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 11827-11831). Pergamon. https://www.sciencedirect.com/science/article/pii/B0080430767019410 https://doi.org/https://doi.org/10.1016/B0-08-043076-7/01941-0

Vallerand, R., Ntoumanis, N., Philippe, F., Lavigne, G., Carbonneau, N., Bonneville-Roussy, A., Lagacé-Labonté, C., & Maliha, G. (2008). On passion and sports fans: A look at football. *Journal of Sports Sciences, 26*, 1279-1293. https://doi.org/10.1080/02640410802123185

Whitbourne, S. K. (2018). *The Two Emotions that Drive Sports Fans*. Retrieved 19/4/21, https://www.psychologytoday.com/us/blog/fulfillment-any-age/201805/the-two-emotions-drive-sports-fans

Winand, M., & Fergusson, C. (2016). More Decision-Aid Technology in Sport? An Analysis of Football Supporters' Perceptions on Goal Line Technology. *Soccer and Society*. https://doi.org/10.1080/14660970.2016.1267629

Winand, M., Schneiders, C., Merten, S., & Marlier, M. (2021, 2021/11/01/). Sports fans and innovation: An analysis of football fans' satisfaction with video assistant refereeing through social identity and argumentative theories. *Journal of Business Research, 136*, 99-109. https://doi.org/https://doi.org/10.1016/j.jbusres.2021.07.029

Young, R. A., & Collin, A. (2004, 2004/06/01/). Introduction: Constructivism and social constructionism in the career field. *Journal of Vocational Behavior, 64*(3), 373-388. https://doi.org/10.1016/j.jvb.2003.12.005

Appendices

Appendix A

Ethics Approval

UC
UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2021/74/LR

28 September 2021

Zin South
Management, Marketing and Entrepreneurship
UNIVERSITY OF CANTERBURY

Dear Zin

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled "The Usage of Video Assistant Referee (VAR) and its Impact on Players' and Fans' Emotions in Football".

I am pleased to advise that this application has been reviewed and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 20th September 2021.
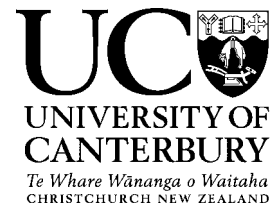
With best wishes for your project.

Yours sincerely

Dr Dean Sutherland
Chair, Human Ethics Committee

Participant Information Sheet

Department of Management, Marketing, and Entrepreneurship
Email: zin.south@pg.canterbury.ac.nz
Date: 21/02/2022
HREC Ref: HEC 2021/74/LR

The Usage of Video Assistant Referee (VAR) and its impact on Players' and Fans' Emotions in Football

Information Sheet for participants

Kia Ora

You are invited to participate in a research study on The Usage of Video Assistant Referee (VAR) and its impact on Players and Fans Emotions in Football.

This study is being conducted by Zin South from the University of Canterbury | Te Whare Wānanga o Waitaha (UC). Other research team members include Tom Coupe and Chris Chen. The study is being carried out as a requirement for a Master of Commerce degree.

What is the purpose of this research?

This research aims to address the impacts VAR is having on football players and fans' raw emotion and experience and provide insight into the preference of absolute accuracy and justice, or the raw emotional experience of the beautiful game, with all its rights and wrongs.

We are interested in understanding the impact of the use of VAR on fan's and players' experience of the game. We also aim to understand whether the raw form of expression at the moment is disrupted and what emotions are experienced.

The findings and results of this paper can provide evidence to help all those who want to contribute to improving the game quality, structure, reaction, and advancement of application and functionality of VAR technology in football in general. The findings and results of this study could help football associations around the world with management decisions when deciding upon the use or refinement of VAR in their respective leagues, as well as current associations that use it and whether they should continue doing so. The study will provide practical advice on possible refinements such as a decision review system, coaches challenge, or a reduction in the time taken.

Why have you received this invitation?

You are invited to participate in this research because you are either a semi-professional or professional football players or a football fan.

Your participation is voluntary (your choice). If you decide not to participate, there are no consequences. Your decision will not affect your relationship with me, the University of Canterbury, or any member of the research team.

What is involved in participating?

If you choose to take part in this research, you will participate in an interview. This interview will take place online via zoom. I will contact you to arrange a suitable time and location. The interview will involve me introducing myself, answering any questions you have, and confirming your consent to participate. Then, I will begin the interview and will ask you questions about the topic. I estimate the interview will take around 20-30 minutes.

Will the interview be recorded?
With your permission, the interview will be audio-recorded using Zoom or Facebooks audio-recording feature. The recording will be used to create a written transcript of the interview, which I will analyse as part of the research. I will use the website Otter.ai to transcribe the interview. If you choose to review a copy of the interview transcript, I will provide this to you within 7 days of the interview. I will ask you to provide any amendments or additions via email within 1 week.

Are there any benefits from taking part in this research?

We do not expect any direct benefits to you personally from participating in this interview. However, the information gathered will potentially benefit football in general. The results and findings of this paper can help all those who want to contribute to the advancement of the application and functionality of VAR technology in football. This study could help football associations around the world with management decisions when deciding upon the use or refinement of VAR in their respective leagues and current associations that use it, and whether or not they should continue doing so.

Are there any risks involved in this research?
We are not aware of any risks to participants in the research

What if you change your mind during or after the study?
You are free to withdraw at any time. To do this, please let me know either during the interview or after the interview has finished. I will remove any information you have provided up to that point from the data set if it is still possible. Once data analysis has commenced removal of your data may not be possible.

What will happen to the information you provide?
I will transfer the audio recording to a password-protected file on the University of Canterbury computer network and then delete this from the recording device as soon as practical. All data will be confidential. To ensure your identity is not known to anyone outside the research team, we will keep your signed consent form in a file separate from your interview transcript.

All study data will be stored in password-protected files on the University of Canterbury's computer network or stored in lockable cabinets in lockable offices.

All data will be destroyed five years after completion of the study/publication of study findings. *I* will be responsible for making sure that only members of the research team use your data for the purposes mentioned in this information sheet.

On the consent form you will be asked to consent to your contact information being securely stored by the research team, and for permission to contact you in the future.

Will the results of the study be published?
The results of this research will be published in a Master's thesis. This thesis will be available to the general public through the University of Canterbury library. Results may be published in peer-reviewed, academic journals. Results will also be presented during conferences or seminars to wider professional and academic communities. You will not be identifiable in any publication. A summary of results will be sent to all participants who request a copy.

Who can you contact if you have any questions or concerns?

If you have any questions about the research, please contact: Zin South zjs15@uclive.ac.nz

This study has been reviewed and approved by the University of Canterbury Human Research Ethics Committee (HREC). If you have a complaint about this research, please contact the Chair of the HREC at human-ethics@canterbury.ac.nz).
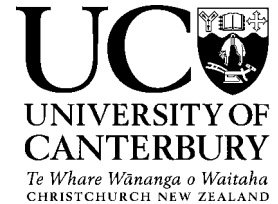
What happens next?
Please review the consent form. If you would like to participate, please sign, scan/take a photo of, and return the consent form to email or hand.

zin.south@pg.canterbury.ac.nz

Appendix C

Participant Consent Form

Department of Management, Marketing, and Entrepreneurship
Email: zin.south@pg.canterbury.ac.nz
21/02/21
HREC Ref: HEC 2021/74/LR

The Usage of Video Assistant Referee (VAR) and its impact on Players and Fans Emotions in Football

Consent Form for Participants

☐ I have been given a full explanation of this project and have had the opportunity to ask questions.

☐ I understand what is required of me if I agree to take part in the research.

☐ I understand that participation is voluntary and I may withdraw at any time without
consequences. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain possible.

☐ I understand that any information or opinions I provide will be kept confidential to the researchers: Zin South, Chris Chen and Tom Coupe. I understand that any published or reported results will not identify me *or my employer, organisation, etc.*

☐ I understand that a thesis is a public document and will be available through the UC Library.

☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form. I understand the data will be destroyed after *five years.*

☐ I agree to being *audio* recorded. I understand how this recording will be stored and used.

☐I understand that I can contact the researcher Zin South zin.south@pg.canterbury.ac.nzor supervisors Tom Coupe tom.coupe@canterbury.ac.nz and Chris Chen chris.chen@canterbury.ac.nz for further information.

☐If I have any complaints, I can contact the Chair of the University of Canterbury Human Research Ethics Committee, Private Bag 4800, Christchurch, (email: human-ethics@canterbury.ac.nz).

☐I would like a summary of the results of the project.

☐I consent to my contact information being kept and used by researchers to contact me about future, related research opportunities

☐By signing below, I agree to participate in this research project.

Full Name: Click or tap here to enter text. Signed:

Email address *(for report of findings, if applicable)*: Click or tap here to enter text.

☐Please review the consent form. If you would like to participate, please sign, scan/take a photo of, and return theis consent form to my *email, or by hand, or by post*
 zin.south@pg.canterbury.ac.nz
 135 Cossars Rd, Tai Tapu 7672
 Christchurch

Appendix D

Interview Schedule

Criteria to carry out interview: During the football season, spends at least one hour per week on activities related to a football team/s (like watching/reading/listing/discussing/playing).

Fans

1. During the football season, how many hours do you spend on activities related to a football team/s (like watching/reading/listening/discussing/playing)?

2. Please recall and describe a story involving VAR you have experienced whilst watching a game? Were you watching it live? How did you feel, opinion, etc

3. How do you feel about the use of technology to arbitrate football matches in general? VAR specifically?

4. Do you think there should be a time frame in which a referee should be allowed to review VAR decisions and for VAR decisions to be made?

5. Do you feel that fans watching on TV and at the stadium are well informed during a VAR check? If no what are the emotions you experience. If yes, what about VAR checks makes you feel like that?

6. Do you think VAR has made watching football matches more or less enjoyable? Why?

7. Are you likely to attend fewer or more games in the future because of VAR?

8. Are you likely to watch fewer or more games in the future because of VAR?

9. Do you believe VAR has had a positive or negative impact on the team you support? Why?

10. Is VAR something that is conscious in your mind when watching a game?

11. Do you think that the usage of VAR adds or detracts from your emotional experience of football? "The way you interpret football games mentally".

12. What is the biggest difference you have found between watching a game with and without VAR?

13. What is your age, gender and nationality?

Players

1. Please recall and describe a story involving VAR you have experienced whilst watching a game? What was in your mind?
2. What is your opinion on the use of technology to arbitrate football matches in general?
3. Do you think VAR has made playing in football matches more or less enjoyable? Why?
4. Do you think there should be a time limit on referee VAR decisions?
5. Do you feel players are well informed during a VAR check?
6. What did you feel during a VAR check for your team and against your team?
7. Do you believe VAR has had a positive or negative impact on the team you play for? Why?
8. Has the implementation of VAR changed the way you train or prepare for games in any way?
9. Is VAR something that is conscious in your mind during a game that it is in use?
10. Do you think VAR plays any role in your decision making?
11. What is the biggest difference you have found between playing in a game with and without VAR?
12. Do you think that the usage of VAR adds or detracts from your emotional experience of football? "The way you interpret football games mentally".
13. What is your age, gender and nationality?

Appendix E: Twitter Sentiment Code

```
import snscrape.modules.twitter as sntwitter
import pandas as pd
```
 # Created a list to append all tweet attributes(data)
```
attributes_container = []

# Using TwitterSearchScraper to scrape data and append tweets to list
for i,tweet in enumerate(sntwitter.TwitterSearchScraper('VAR Decision'+' since:2019-07-13
until:2019-09-05 lang:en').get_items()):
    if i>5000:
        break
    attributes_container.append([tweet.date, tweet.likeCount, tweet.lang, tweet.sourceLabel,
tweet.content])
```

 # Creating a dataframe from the tweets list above

```
tweets_df = pd.DataFrame(attributes_container, columns=["Date Created", "Number of
Likes","Language", "Source of Tweet", "Tweets"])
tweets_df =tweets_df[tweets_df['Language']=='en']
tweets_df=tweets_df .reset_index(drop=True)
tweets_df
```

 # loop over all snippets and make a list with all the 'neg' (negative) scores
```
import nltk
nltk.download('vader_lexicon')
from nltk.sentiment.vader import SentimentIntensityAnalyzer as SIA

sia = SIA()
results = []

for i in range(0,len(tweets_df)):
    pol_score = sia.polarity_scores(tweets_df['Tweets'].loc[i]) # this takes each tweet

    results=results+[pol_score['pos']] # then computes the negativity score – you can also get
the positive or neutral score
print(results) # this gives the score for each tweet
```

 # then compute the average neg score across snippets
```
import numpy as np
np.mean(results) # this gives average negativity score
```

 # loop over all snippets and make a list with all the 'neg' (negative) scores

```
import nltk
nltk.download('vader_lexicon')
from nltk.sentiment.vader import SentimentIntensityAnalyzer as SIA
sia = SIA()
resultspos = []
resultsneg = []
```

```
resultsneu = []
resultscomp = []
resultsmoreneg=[]
resultsmorepos=[]

for i in range(0,len(tweets_df)):

    pol_score = sia.polarity_scores(tweets_df['Tweets'].loc[i])
    resultspos=resultspos+[pol_score['pos']]
    resultsneg=resultsneg+[pol_score['neg']]
    resultsneu=resultsneu+[pol_score['neu']]
    resultscomp=resultscomp+[pol_score['compound']]
    resultsmorepos=resultsmorepos+[(pol_score['pos']>pol_score['neg'])*1]
    resultsmoreneg=resultsmoreneg+[(pol_score['neg']>pol_score['pos'])*1]
```

 # then compute the average neg score across snippets
```
import numpy as np
print( np.sum(pd.Series(resultscomp)>0.05)/len(resultscomp)) # pos
print( np.sum(pd.Series(resultscomp)<-0.05)/len(resultscomp)) #neg

print((np.sum(pd.Series(resultscomp)<-
0.05)/len(resultscomp))/(np.sum(pd.Series(resultscomp)>0.05)/len(resultscomp)))
```

 # for each pos tweet, how many negative tweets do we have
```
print(np.mean(resultscomp))
# the average compound score
tweets_df.to_csv("Tweets2019.csv")
```

Winand, M., & Fergusson, C. (2016). More Decision-Aid Technology in Sport? An Analysis of Football Supporters' Perceptions on Goal Line Technology. *Soccer and Society*. https://doi.org/10.1080/14660970.2016.1267629